



# The Crypto Mines: Diverse Insights with Legal Perspectives

Mohit Tanwar

Foreword by Mr. Raj Kapoor,  
Founder & CEO, India Blockchain Alliance

*m*  
manda  
Publishers

**Title: The Crypto Mines: Diverse Insights with Legal Perspectives**

**Author: Mohit Tanwar**

©All rights reserved

All rights reserved by authors. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the author.

Although every precaution has been taken to verify the accuracy of the information contained herein, the author and publisher assume no responsibility for any errors or omissions. No liability is assumed for damages that may result from the use of information contained within. All legal actions are subject to jurisdictions of courts of New Delhi, India.

First Published by Manda Publishers in 2024

**ISBN: 978-93-6402-142-5**

**Price in INR: 999/-**

Manda Publishers

[www.mandapublishers.com](http://www.mandapublishers.com)

[publish@mandapublishers.com](mailto:publish@mandapublishers.com)

+91 9999190496

**Cover Design: Tanya**

**Typography: Siddharth**

**Distributed by:**

Amazon, Flipkart, Manda Publishers etc.

**Printer:**

Manipal Technologies



# Dedication

Dedicated to Maa Saraswati



As a matter of fact, 2024 marks my ninth consecutive year in the field of legal academics, including my BA.LLB (Integrated Course), LLM in Corporate Laws, ongoing PhD (Law) and two years of teaching experience at the University School of Law & Legal Studies (USLLS), GGS IP University, New Delhi, India. It is pertinent to mention that, throughout these nine years, not a single day has passed without me seeking blessings from the pious statue of Maa Saraswati before undertaking any work or endeavour. This statue is located near the Central Library of our University's Main Campus in Dwarka. It is generally believed that everything in life happens for a reason and perhaps there is a reason behind writing this book as well. However, what I am absolutely sure of is that such an endeavour would not have

been possible without the approval and blessings of Maa Saraswati. Hence, this book is solely dedicated to her with folded hands.

As I have written this book within the time frame of my ongoing PhD (Law) at GGS IP University, New Delhi, India, I am happy to consider this work as an integral part of my current academic journey. Therefore, I dedicate this book to Maa Saraswati.

Additionally, I am highly indebted to my parents (Shri Raj Kumar Tanwar & Mrs. Pankaj Verma), my brother (Mr. Devinder Pal) and sister (Ms. Angel Tanwar), my PhD supervisor (Dr. Zubair Ahmed Khan, Sir), all the distinguished faculties at USLLS, all the orderly help aids and office staff at USLLS and my students for continuously motivating me to pursue my passion for Web3, crypto and blockchain technology by writing a book on such a challenging and contemporary field. Last but not the least, I would also like to acknowledge the help and mentorship provided by the Legal Entrepreneurship and Incubation Cell (LEIC) of USLLS in this endeavour.

**Mohit Tanwar,  
IPRF (PhD Scholar), USLLS,  
GGS IP University,  
New Delhi, India.**



# About the Author



Mohit Tanwar, a distinguished scholar, holds the prestigious Indraprastha Research Fellowship (IPRF) from Guru Gobind Singh Indraprastha University, New Delhi and is currently pursuing a Ph.D. in law at the University School of Law Legal Studies, GGS IP University, specialising in Digital Payments and Corporate Governance. As an esteemed IPRF scholar at USLLS, he possesses knowledge in diverse legal subjects, including Alternative Dispute Resolutions (ADR), Law of Tort, Code of Civil Procedure, Constitutional Law & Criminal Law. Mohit is the visionary Founder & Mentor of Top The Semester (Formerly, Verdict Vault), a legal Ed-Tech platform dedicated to enlightening minds and fostering success. He is active in the field of Web3, Crypto and Blockchain Technology since the year 2014, in both academic and practical fields. He has authored various publications related to Non Fungible Tokens (NFTs), Central Bank Digital Currencies (CBDC), etc. in various reputed journals. His impactful legal research projects with the Ministry of Law & Justice, Government of India and his role as the sole keynote speaker from Asia at the City DAO International

Conference in the panel of Funding The Web3 Education showcase his legal academic & practical influence. Moreover, he is having several law related national and international publications as well as presentations in his name. Additionally, he has done several certifications alongside his academic journeys from various reputed organisations such as World Intellectual Property Organisation (WIPO), The Korean Intellectual Property Office (KIPO), Indian Society of International Law (ISIL) and Technology Law Forum (TLF). Mohit actively shapes the discourse on the future of legal education.



# Foreword

There are few moments in history when technological advancements transcend innovation and become the cornerstone of transformation—impacting not just industries but the very fabric of society. The rise of blockchain, cryptocurrencies, NFTs, and the metaverse marks one such moment. An enigma to many, these emerging technologies promise to alter how we think about trust, ownership, value, and identity in the digital realm, much like the internet did decades ago. Yet, as with all paradigm shifts, they are often met with confusion, skepticism, and speculation. For many, this space can feel like an enigma, filled with terms and concepts that seem complex, elusive, and detached from day-to-day life. It is for this very reason that the book you hold in your hands is so essential.

This book has a single, yet impactful goal: to educate, demystify, and empower the everyday person. It starts from the ground up, providing a thorough, digestible, and accessible introduction to cryptocurrencies, blockchain technology, NFTs, the metaverse, and more. But it goes beyond merely explaining these concepts—it navigates the reader to think critically, ask the right questions, and develop their own independent opinions about this space. In a world where headlines can be sensational and misinformation is rampant, the value of a balanced and well-informed perspective cannot be overstated.

What makes this work stand apart is Mohit's deep commitment to clarity and understanding. He possesses a rare gift: the ability to take highly technical and often intimidating subjects and break them down into engaging, insightful, and comprehensible narratives. This is no small feat, especially given the rapid pace of change in the blockchain and cryptocurrency space. Mohit has dedicated his expertise, patience, and passion to crafting a resource that is not just a primer but a true companion for anyone curious about these technologies—whether you're an absolute beginner or someone looking to solidify your foundational knowledge.

I speak not just as a reader, but as someone who has had the privilege of witnessing the evolution of blockchain technology from both inside and out. As the Chairman of the India Blockchain Alliance and an advisor to blockchain-driven enterprises, I have experienced firsthand how these innovations are reshaping industries. Blockchain is revolutionising how we establish trust in transactions, cryptocurrencies are redefining the very notion of money and value exchange, NFTs are challenging the traditional views of ownership in the digital space, and the metaverse is extending our human experience into virtual realms. Each of these technologies presents new possibilities, and with them, new challenges. Understanding these nuances is critical, and that's exactly what this book seeks to impart.

In many ways, we are standing at the cusp of a new era. Just as the internet did in its early days, blockchain and its related technologies will evolve, adapt, and infiltrate nearly every corner of our lives. But with this evolution comes responsibility—responsibility to learn, to stay informed, and to engage with these technologies in a meaningful way. This book equips readers with the tools they need to step into this new world with confidence, curiosity, and caution.

I have immense respect for Mohit's dedication to this cause. This approach is not driven by hype or sensationalism, but by a genuine desire to provide a clear and balanced understanding of the opportunities and risks that these technologies present. They invite readers to form their own judgments, without bias or influence, and that, to me, is the mark of true education.

In my own journey through the world of blockchain and cryptocurrencies, I have seen how education can transform not just minds, but entire industries. The power of understanding this space lies not in memorising technical details or becoming an expert coder but in grasping the broader implications of what these technologies mean for us all. Whether it's the promise of decentralised finance, the potential for NFTs to reshape art and media, or the future of human interaction in the metaverse, these topics touch every facet of modern life. And the more we understand them, the better equipped we will be to navigate the future they are helping to create.

This book is your guide. It offers a roadmap to understanding a rapidly evolving space that, though complex, is not impenetrable. Mohit's ability to distill these concepts into relatable, understandable terms ensures that by the time you reach the final pages, you will not only have a solid grasp of the fundamentals, but you will also feel empowered to explore these topics further, with a critical and informed perspective. This is the beginning of your journey into the world of blockchain, cryptocurrencies, NFTs, and beyond—a journey that holds immense promise and potential for those who take the time to understand it.

As you turn these pages, know that you are stepping into a calming pool of knowledge and opportunity. Mohit has laid the groundwork for your exploration, and it is now up to you to continue the journey with an open mind and a thoughtful approach. It is a journey that will be as transformative as it is enlightening.

It is with great respect for Mohit's work, and deep belief in the value this book will bring to you, the reader, that I offer this foreword. May it serve as both an introduction and an invitation to the future—a future that is already here, and one that is yours to discover.



**Mr. Raj Kapoor**

Founder & CEO, India Blockchain Alliance.

Chairman, Global Alliance for Artificial Intelligence and  
Innovation.

Raj is the Founder of India Blockchain Alliance, the largest Indian emerging technology tech thinktank, the Chairman of the Global Alliance for Artificial Intelligence and Innovation and an

Advisory Board Member at over 70 blockchain companies including Tata Elxsi, Adlunam, Ztudium Ltd, AI Planet and more. He is a global Blockchain & Cryptocurrency & FinTech Educator, Certified Bitcoin Professional (CBP), Blockchain Solution Architect, and friend of disruptive ideas, Protem Chairman for Organization of Blockchain Technology Users (OBTU). He is also the Chief Board Advisor for Nappbooks Ltd, for who he heads the world's largest project for implementing blockchain for E- Notary services, Govt. of India. He is also the CEO of Growth Alley Inc, USA. Raj has been recently onboarded to the Velocity Foundation, USA as Advisory Board member - to set up the Internet of Careers.



# Preface

The current era is generally termed as the era of digitization and the age of technology. Currently, we are witnessing some drastic changes in the payments and banking segment. The augmentation of private digital currencies, popularly known as ‘cryptocurrencies,’ that are backed by blockchain technology, have successfully demonstrated their potential to disrupt traditional financial systems and allied segments. For several reasons, we have seen enormous mass adoption of cryptocurrencies, especially Bitcoin. It is pertinent to mention that the subject matter of cryptocurrencies holds its own pros and cons, presenting various challenges to different stakeholders in the field of finance, including the investors as well as potential regulators.

As cryptocurrencies are a contemporary development in the ongoing fintech revolution worldwide, many intended investors wish to enter or at least learn about this subject with interest and enthusiasm. Records suggest that it is not easy to blindly trust the advice of various content creators in the crypto ecosystem on social media platforms. On several occasions, innocent investors have become prey to the advices of such influencers and have ended up by suffering irreparable financial losses. The driving force for solely relying on someone else’s advice is one’s lack of knowledge in this novel crypto space.

While investigating, I was able to examine the major reason behind this gap. Innocent people are becoming prey to some misleading content creators in the crypto ecosystem primarily because there is a scarcity of good academic content across both free and paid resources on the internet, as well as in physical documentary form. As a matter of fact, not every influencer or promoter or content creator of crypto ecosystem is bad, rather there exist many such crypto content creators who genuinely intend to educate general masses of people regarding the crypto ecosystem. Although one’s own developed understanding and knowledge always amounts to be the

best as it is generally said and believed that, “a person is the best judge for themselves”. Secondly, though good content does exist, it is often very difficult for a layman to understand the technical and technological aspects of crypto and blockchain. Thirdly, it is not possible for every layman to comprehend the study of technical charts and patterns used in crypto trading.

Hence, there is a dire need to provide people with authentic and user-friendly content on cryptocurrencies and blockchain technology, which has been written from a layman's point of view, so that a layman can reasonably understand the crypto ecosystem to a greater extent. The sole idea behind writing this book is to offer comprehensive, authentic and approachable knowledge about the entire crypto ecosystem to the masses. Choosing to invest or not invest in cryptocurrencies is one thing, but remaining completely unbeknownst to this major technological advancement in digital finance is another. No one should remain ignorant of this field, especially since advocates of Web3, crypto and blockchain technology recognize these innovations as the future. I firmly believe that if these technologies collectively constitute the future, it is still essential that this future must be secured and such security must rest in the hands of ordinary & reasonable prudent individuals. This can only be achieved through mass adoption of the crypto ecosystem, which is impossible without proper knowledge and awareness of this field among the masses.

I have been active in this space since 2014 and intend share my existing knowledge with the readers through this book. The book has been written keeping in mind the layman's understanding, to ensure that anyone, regardless of background, can reasonably grasp the subject matter of crypto and build their knowledge in this field independently. The book contains eight comprehensive chapters and a bonafide attempt has been made to cover every minute detail of this field to help achieve the desired objective of educating, informing and preparing laymen for the fintech revolution attributed to cryptocurrencies and blockchain technology. Additionally, the book covers major legal insights and developments from various countries, capturing how their respective governments and appropriate authorities are addressing issues related to the crypto ecosystem. It also contains a comprehensive section on the legal aspects, as

regulation is arguably the most critical need in the crypto space. Furthermore, as the subject is relatively new, crypto crimes are increasing day by day and to combat such crimes, law is the greatest weapon in the modern world. Given my legal background, I aim to elaborate on the subject matter of crypto in a way that it should be both effective and accessible to laymen as well as the legal professionals while discussing various legal aspects related to this field.

It is important to note that this book is written solely for academic discussion concerning cryptocurrencies and blockchain technology. It does not provide any financial advice to either invest or not to invest in cryptocurrencies and related matters. The intention behind writing this book is crystal clear and that is to inform and educate the general audience about the crypto ecosystem from a purely academic perspective. Additionally, the book contains a number of case studies related to various cryptocurrencies and blockchain technology firms, used solely for critical analysis. These case studies are intended to help the readers to understand both simple and complex aspects of the crypto ecosystem and they do not violate anyone's legal rights, sentiments or image.

Lastly, I would like to express that, "there are miles to go before I sleep, and sooner or later, that day will inevitably come when I have to finally sleep. However, this book will carry on my legacy, by serving as my clone to educate, inform and prepare the general public regarding the novel subject of cryptocurrencies and blockchain technology, even in my absence."

**Mohit Tanwar,**  
**IPRF (PhD Scholar), USLLS,**  
**GGs IP University,**  
**New Delhi, India.**



# Author's Disclaimer & Limitation of Liability

This book has been written and published solely for academic purposes and is intended to provide educational content on the subjects of cryptocurrencies, blockchain technology and associated legal angles, including but not limited to crypto crimes, jurisdictions, and case studies. The content within this book is designed to foster a deep understanding and facilitate intellectual discussions. In no context should it be construed as financial or investment advice. Readers are encouraged to perform their own research and seek professional guidance before making any financial decisions. The information, analysis and case studies presented in this book are based on data available at the time of writing and substantial efforts have been made to ensure accuracy and completeness. The author does not guarantee or warrant the absolute correctness of all information contained herein.

Additionally, constructive criticism and/or analysis of certain projects, including those involving infamous scams or controversies within the cryptocurrency ecosystem, is strictly included for conducive academic discussion and in good faith. The content is meant to enhance the reader's understanding of the subject matter and should not be interpreted as defamatory or injurious to the reputation of the entities involved. The author explicitly disclaims any intent to cause harm or misrepresent any organization or individual mentioned hereunder.

By engaging with this book, the reader acknowledges and agrees that the author shall not be held liable for any inaccuracies, omissions or consequences arising from the use or interpretation of the information provided. The author accepts no responsibility for any losses, damages or liabilities, either direct or indirect, that may result from the use of this book's content. The reader assumes full

responsibility for any actions taken based on the material presented in this book.



# Table of Contents

Chapter 1.....	1
Unveiling Cryptocurrencies: The New Financial Frontier .....	1
1.1 A Prelude to the Digital Currency Revolution.....	2
1.2 Cryptocurrency 101: Demystifying the Basics for All.....	3
1.3 The Rise of Cryptocurrencies: Tracing the Origin and Demand .....	4
1.4 Cryptocurrency and the Law: A Global Overview .....	5
1.4.1 United States of America (USA).....	6
1.4.2 Europe.....	7
1.4.3 Asia.....	8
1.4.4 Africa.....	8
1.4.5 South America.....	9
1.4.6 Australia .....	10
1.4.7 India .....	10
1.5 Cryptocurrencies in the Physical and Virtual Realms: A Dual Impact .....	15
1.5.1 Bored Ape Yacht Club (BAYC).....	16
1.5.2 Crypto Punks.....	17
1.5.3 Sandbox: The Metaverse .....	19
1.5.4 Decentraland: The Metaverse .....	20
1.6 A Spectrum of Cryptocurrencies: Understanding the Key Players .....	22
1.6.1 Blockchain-Based Crypto:.....	22
1.7 Meme Coins or Tokens: .....	35
1.7.1 Dogecoin (DOGE) .....	36

1.7.2 Shiba Inu (SHIB)	39
1.7.3 Babydoge Coin	40
1.7.4 Floki Inu (FLOKI)	42
1.7.5 Dogelon Mars (ELON)	43
1.8 DEX Related Crypto:	45
1.8.1 Cake Token (Pancake Swap)	45
1.8.2 UNI Token (Uniswap)	47
1.8.3 SUSHI Token (Sushiswap)	49
1.8.4 Shibaswap	51
1.8.5 QUICK Token (Quickswap)	53
1.9 AI Coins:	55
1.9.1 SingularityNET (AGIX)	55
1.9.2 Fetch.ai (FET)	56
1.9.3 Ocean Protocol (OCEAN)	57
1.9.4 Numeraire (NMR)	58
1.9.5 IExec RLC (RLC)	59
1.10 Privacy Coins or Tokens	60
1.10.1 Monero (XMR)	61
1.10.2 ZCash (ZEC)	62
1.10.3 Ergo (ERG)	63
1.10.4 Dash (DASH)	64
1.10.5 Decred (DCR)	66
1.11 Stablecoins:	67
1.11.1 Tether (USDT)	67
1.11.2 USD Coin (USDC)	69
1.11.3 Dai (DAI)	71
1.11.4 True USD (TUSD)	72
Chapter 2	75
Blockchain: The Backbone of Cryptocurrencies	75
2.1 An Overview of Blockchain Technology	75
2.1.1 Exploring Blockchain Types and Real-World Applications	77
2.1.2 Consensus Mechanisms: The Heartbeat of Blockchain Networks	78

2.2 Blockchain Explained: From Genus to Species .....	79
Chapter 3.....	93
Cryptocurrencies: Working Models, Pros, and Cons .....	93
3.1 India’s Banking Framework: A Traditional Perspective .....	94
3.1.1 Traditional Banking Payment Model.....	94
3.1.2 Modern Banking Payment Model including CBDC .....	95
3.2 Comparing Payment Systems: Cryptocurrencies vs Traditional Banking.....	96
3.3 Understanding Centralized (CEX) and Decentralized Exchanges (DEX) in Crypto Payments .....	97
3.3.1 The following are key explanations and insights with respect to Wallets in the Crypto Ecosystem: .....	99
3.4 CBDC (Central Bank Digital Currency): Introduction and Comparative Analysis .....	101
3.4.1 CBDC : India’s Approach.....	103
Chapter 4.....	109
Cryptocurrencies : Shaping Market Trends and Sentiments.....	109
4.1 An Overview of the Market Dynamics .....	109
4.1.1 Key Drivers of the Crypto Market: Decoding the Influencing Factors.....	111
4.1.2 Various cryptocurrencies influenced by Elon Musk, are as follows: .....	115
4.1.3 Some Cryptocurrencies influenced by Snoo Dogg are: .....	117
Chapter 5.....	125
Mastering Crypto Trading : A Layman’s Guide to DYOR (Do Your Own Research) .....	125
5.1 DYOR: Why It Matters in the Crypto Space.....	126
5.1.1 Navigating the Risks: Key Rules and Principles of the Crypto Market.....	127

5.2 Volatility is Normal.....	130
5.2.1 Short-term Losses Can Turn into Long-term Gains ...	130
5.2.2 Emotional Decisions Can Be Costly .....	131
5.2.3 Timing the Market is Difficult.....	131
5.2.4 Stick to Your Investment Strategy.....	131
5.2.5 “Keep track of your portfolio and adjust it as necessary...” .....	132
5.2.6 “Don't invest in projects or coins that you don't understand...” .....	133
5.2.7 “Use stop-loss orders to limit your losses...” .....	134
5.2.8 “Don't invest all your money in one coin or project...” .....	135
5.2.9 “Diversify your portfolio across different coins and projects...” .....	136
5.2.10 “Stay informed about the latest news and developments in the crypto market...” .....	137
5.3 A Beginner’s Checklist: Essential Factors to Consider Before Investing.....	138
5.3.1 Project’s Objective .....	138
5.3.2 Journey and Commitments so far of Various Crypto Projects .....	139
5.3.3 Transparency of the Team associated with a Crypto Project .....	141
5.3.4. Use Cases.....	142
5.3.5 Tokenomics .....	144
5.3.6 Burning Mechanism .....	145
5.3.7 Community associated with a Crypto Project .....	146
5.3.8 The Best Social Media Forums for Crypto across the Internet.....	147
5.3.9 Partnerships with Web2 and Web3 Firms .....	148
5.3.10 Events.....	149
5.3.11 Integration with Other Blockchains .....	150
5.3.12 Rug Pulls .....	151
5.3.13 Ratio of Token Holders or Whales .....	152
5.3.14 Trading Platforms .....	153
Chapter 6.....	155

Cryptocurrencies: Best Platforms for Trading .....	155
6.1 Centralised Exchanges .....	157
6.1.1 Domestic (Indian) CEXs.....	157
6.1.2 Global CEXs .....	159
6.1.3 Centralised Exchanges: Domestic vs Global .....	162
6.2 Decentralised Exchanges.....	163
 Chapter 7.....	 169
Crypto Crime: A Legal Perspective and Global Response .....	169
7.1 Unmasking Crypto Crimes: An Introduction .....	170
7.2 Tracing the Evolution of Crypto Crimes .....	175
7.2.1 Types of Crypto Crimes: A Comprehensive Overview	181
Case Studies .....	185
Case Studies .....	193
Case Studies .....	200
Case Studies .....	216
7.2.3 Global Response: How Authorities and Governments	
Combat Crypto Crimes.....	220
7.3 Markets in Crypto-Assets (MiCA) Regulation .....	223
7.3.1 Asia.....	224
7.3.2 India’s Strategy for Tackling Crypto Crimes: Lessons	
from Abroad .....	229
7.4 Navigating the Complex Legal Landscape of Crypto Crimes	
.....	231
7.5 Technological Solutions: Fighting Crime in the Digital	
World.....	233
7.6 Preventing Crypto Crimes: Key Methods of Protection.....	236
 Chapter 8.....	 243
Key Insights into the Crypto Ecosystem: Trends, Opportunities,	
and Risks .....	243

8.1 The Investors Shaping the Crypto Ecosystem .....	244
8.1.1 Day traders: .....	244
8.1.2 Holders (Hodlers): .....	245
8.2 Crypto: Bubble or Breakthrough? .....	247
8.3 Not All Cryptocurrencies Are Gems, Nor Are They All Scams! .....	248
8.4 Bitcoin: The Gateway to Understanding the Entire Crypto Space .....	251
8.5 Ethereum: The Driving Force Behind Web3 and Decentralization .....	252
8.6 Meme Coins : A Cultural Phenomenon or Fad? .....	254
8.7 NFTs: A Disruptive Innovation or a Passing Bubble? .....	255
8.8 Staking in Crypto: A Passive Income Opportunity.....	257
8.9 Crypto Burning: Reducing Supply, Boosting Value .....	260
8.10 ICO (Initial Coin Offering): Fueling Innovation in the Crypto World .....	262
8.11 Decoding Trading Charts: A Must-Know for Crypto Traders .....	264
References.....	267





# Chapter 1

## Unveiling Cryptocurrencies: The New Financial Frontier

*"Mobile was Internet 2.0. It changed everything. Crypto is Internet 3.0."*

— ***Gil Penchina***<sup>1</sup>

### Synopsis

- 1.1 A Prelude to the Digital Currency Revolution
- 1.2 Cryptocurrency 101: Demystifying the Basics for All
- 1.3 The Rise of Cryptocurrencies: Tracing the Origin and Demand
- 1.4 Cryptocurrency and the Law: A Global Overview
- 1.5 Cryptocurrencies in the Physical and Virtual Realms: A Dual Impact
- 1.6 A Spectrum of Cryptocurrencies: Understanding the Key Players
- 1.7 Meme Coins or Tokens
- 1.8 DEX Related Crypto
- 1.9 AI Coins
- 1.10 Privacy Coins or Tokens
- 1.11 Stablecoins

---

<sup>1</sup> Gil Penchina, *Mobile was Internet 2.0. It changed everything. Crypto is Internet 3.0*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

## 1.1 A Prelude to the Digital Currency Revolution

Cryptocurrencies are different from conventional money as they operate independently from a central regulating authority and it uses a blockchain technology, that is generally a decentralized ledger technology which keeps a track of transactions and balances. They are either digital or virtual financial alternatives that utilize algorithms to ensure and authenticate transactions, as well as the creation of new units.<sup>2</sup> For example, one such most famous cryptocurrency is Bitcoin, which was created by someone going under the pseudonym of Satoshi Nakamoto in 2009. Meanwhile, altcoins, which are numerous like thousands of other cryptocurrencies have been established.<sup>3</sup> This has seen many people turn towards investing in it because it comes with several advantages over traditional currency. They are not controlled by any government or financial institution hence being decentralised which makes them more resistant to government interference and censorship. Cryptocurrencies have other benefits such as being faster and cheaper to transfer than traditional fiat currencies. Transactions take minutes rather than hours or days as compared to the typical fiat currencies, while the associated costs are lower as compared to those associated with traditional banking systems. Cryptocurrencies, although advantageous, experience a few obstacles, for instance lack of regulation which has resulted in the fear of scamming, money laundering and other illicit activities. Moreover, cryptocurrencies are highly unpredictable which makes investing in them risky. However, despite these problems, more and more people and companies are now using digital currencies to settle bills. It is not yet certain whether

---

<sup>2</sup> Explained: Everything you need to know about cryptocurrencies - Times of India, The Times of India (Feb. 3, 2022), <https://timesofindia.indiatimes.com/business/cryptocurrency/bitcoin/explained-everything-you-need-to-know-about-cryptocurrencies/articleshow/88892520.cms> (last visited Mar. 26, 2023).

<sup>3</sup> Contributors to Wikimedia projects, *Bitcoin - Wikipedia*, WIKIPEDIA, THE FREE ENCYCLOPEDIA (Mar. 8, 2009), [https://en.wikipedia.org/wiki/Bitcoin#cite\\_note-ageofcr-21](https://en.wikipedia.org/wiki/Bitcoin#cite_note-ageofcr-21) (last visited Mar. 20, 2023).

they will become an ordinary medium of exchange or continue to be a specialized technology meant for a privileged group.<sup>4</sup>

## 1.2 Cryptocurrency 101: Demystifying the Basics for All

Digital cash in the form of cryptocurrencies is obtainable online as well as offline. Cryptocurrencies operate on cryptography, meaning one doesn't have to trust any bank or government to keep tabs on their transactions and make sure that no one else can access your money. In case of traditional currency such as the dollar or euro, you give your money to a cashier, who gives you the item you want to buy. Bitcoin on the other hand requires that you use digital money from your "wallet" on your phone or computer in order to pay for it while the seller gets paid digitally.<sup>5</sup> For example, when sending Bitcoin to a friend, one creates a transaction that consists of the amount of Bitcoin they wish they could send and their friend's digital wallet address. The transaction is then broadcasted to a network of computers that validate and record all Bitcoin transactions. After verifying the transaction, Bitcoin is taken out of your digital wallet and placed into your friend's digital wallet, then recorded in a public ledger called blockchain.

One benefit of cryptocurrencies is that they can be faster and cheaper to transfer than traditional currencies. For example, sending money to a friend in another country could take several days and involve fees charged by multiple banks, but with cryptocurrencies, the transaction can be completed in a matter of minutes, and the fees are typically much lower than those associated with traditional banking. However, cryptocurrencies can also be volatile and risky to invest in. The value of cryptocurrencies can be highly volatile, and their value

---

<sup>4</sup> *The evolution of cryptocurrencies in India and what the future looks like*, TIMES OF INDIA BLOG (May 5, 2022), <https://timesofindia.indiatimes.com/blogs/voices/the-evolution-of-cryptocurrencies-in-india-and-what-the-future-looks-like/> (last visited Mar. 20, 2023).

<sup>5</sup> Kinza Yasar & Lauren Horwitz, *What Is a Digital Wallet And How Does It Work? | Definition from TechTarget*, WHATIS.COM (Aug. 25, 2022), <https://www.techtarget.com/whatis/definition/digital-wallet> (last visited Mar. 23, 2023).

can change rapidly over time, just like stocks. Overall, cryptocurrencies are a new and exciting way to buy and sell goods and services, but it is important to understand their benefits and risks before investing in them or using them to make purchases. Cryptocurrencies have the potential to be faster and cheaper to transfer as compared to traditional currencies.<sup>6</sup> For instance, it may take a few days while incurring fees from various banks when sending money to a friend in another country. However, the transaction can be completed within few minutes using cryptocurrencies, which also have lower rates than those of regular banks. Nonetheless, investing in cryptocurrencies is very dangerous and can result in huge losses. Cryptocurrencies are highly volatile assets whose prices change at very high speeds as equities do. On the whole, it is an emerging and thrilling new method of buying and selling anything one could think of. Nevertheless, it is important to comprehend their advantages and disadvantages before you venture into them or use them for purchasing anything.

### 1.3 The Rise of Cryptocurrencies: Tracing the Origin and Demand

The birth of cryptocurrencies can be traced back to early 2000s, when computer scientists including cypherpunks were exploring decentralized digital currencies which could facilitate peer-to-peer transactions without involving intermediaries or central authority. In 1998, a crypto-currency called “b-money” was proposed by computer scientist, Wei Dai, that relied on decentralized consensus to validate transactions. Then, in 2009, an unknown person or group of people using the pseudonym Satoshi Nakamoto published a white paper that described the Bitcoin project and how it would operate as a digital currency.<sup>7</sup> This document presented an alternative system for transferring money online directly between two individuals without

---

<sup>6</sup> Nikita Tambe, *Advantages and Disadvantages of Cryptocurrency in 2023*, FORBES ADVISOR INDIA (Mar. 23, 2023), <https://www.forbes.com/advisor/in/investing/cryptocurrency/advantages-of-cryptocurrency/> (last visited Mar. 22, 2023).

<sup>7</sup> GEEKS, <https://vocal.media/geeks/cryptocurrency-for-beginners-a-complete-guide> (last visited on March 15, 2023).

the requirement of a trusted third party.<sup>8</sup> Blockchain, which is the fundamental technology underlying Bitcoin, is a distributed ledger system that employs cryptographic techniques to validate and secure financial transactions. To keep the blockchain alive and secured, there is a network of computers known as nodes that work together to check if every transaction is valid and secure the integrity of the network.<sup>9</sup> The advantages of cryptocurrencies over traditional financial systems include fast and low-cost peer-to-peer payments without any central authority or intermediary involvement and this characteristic makes them especially useful for international remittances, micro-payments and other cases where traditional financial systems are impractical or costly.

All transactions in cryptocurrencies are publicly recorded on a blockchain ledger that can be transparently audited by anyone with an internet connection and this makes them fraud-resistant and counterfeit-resistant as well, thus they tend to be accountable and transparent. However, the cryptocurrency market is needed to be regulated as it continues to grow so as to maintain its integrity and stability. Governments across the globe have started implementing rules and regulations that govern virtual currencies usage including curbing illicit activities like money laundering or financing terrorism. In summary, cryptocurrencies have become an integral part of the global monetary system providing numerous benefits over traditional financial systems. On the other hand, they present their own challenges and risks which users need to understand when investing in or using any form of digital currency.

## 1.4 Cryptocurrency and the Law: A Global Overview

Cryptocurrencies represent a type of digital or virtual currency that uses cryptographic processes to secure transactions, control unit creation as well as verify it. It has become a popular alternative currency to fiat money with the promise of decentralization, security,

---

<sup>8</sup> BANK OF ENGLAND, <https://www.bankofengland.co.uk/financial-stability-in-focus/2022/march-2022> (last visited on March 15, 2023).

<sup>9</sup> BITCOIN PRICE FUTURE, <https://mrser.controltech-instalacje.pl/> (last visited on March 15, 2023).

anonymity among others. Nevertheless, cryptocurrency's legal status is quite subjective as it varies greatly, depending on country or jurisdiction, where certain countries consider it as legal tender while others ban its existence comprehensively. As a decentralized currency it is not linked to any state or financial institution leading to widespread debates about its legality worldwide.<sup>10</sup>

### 1.4.1 United States of America (USA)

The subject matter of cryptocurrency in the United States is a bewildering and perpetually transforming legal matter. The American government has made a variety of regulatory policy statements about cryptocurrencies and the laws regulating these virtual assets differ across states. US Government's attitude towards cryptocurrencies has been conservative as evidenced by regulators and legislators that are trying to weigh its potential gains against the threat it poses on ordinary customers, investors, and financial market system at large.<sup>11</sup> In terms of taxation, cryptocurrency is considered to be property by the Internal Revenue Service (IRS). This means that any profit or loss on cryptocurrency sales will attract tax obligations. Cryptocurrency exchanges should also comply with the Financial Crimes Enforcement Network (FinCEN) directive whereby they must register as money transmitting businesses (MTBs), subject to anti-money laundering (AML) and customer identification procedures (CIP). SEC views certain assets representing digital currency as securities making them subject to regulation as per securities rules.<sup>12</sup>

The legality of cryptocurrency is undisputed although there are several legal grey areas around their use and regulation. For example, the US Internal Revenue Service has not yet issued definitive

---

<sup>10</sup> Crypto Predictions for Crypto Market Investors, BITCOINIST, <https://bitcoinist.com/cryptopredictions-for-crypto-marketinvestors/> (April 4, 2023, 6:29 PM)

<sup>11</sup> Blockchain Law Firm – Oberheiden, P.C. - Federal Lawyer, <https://federallawyer.com/blockchain/> (April 4, 2023, 6:29 PM)

<sup>12</sup> Financial Crimes Enforcement Network, [https://www.ncen.gov/sites/default/les/shared/sar\\_guidance\\_casino.pdf](https://www.ncen.gov/sites/default/les/shared/sar_guidance_casino.pdf) (April 4, 2023, 6:29 PM)

guidance on how to tax cryptocurrencies which has resulted in confusion for tax payers and investors alike. Additionally, there are ongoing debates about whether some cryptocurrencies should be treated as securities or commodities or something else completely. These discussions have serious implications on the regulation of cryptocurrencies as well as their trading and use within the United States.<sup>13</sup>

### 1.4.2 Europe

In Europe, the legality of cryptocurrency differs from country to country. Some nations have embraced cryptocurrency wholeheartedly, while others have put up tight regulations concerning its use. The European Union has also published directives regarding how digital currency should be handled under EU law. In Europe it seems to be lawful but subject to diverse rules and regulations. For instance, in Germany, cryptocurrency is considered as a financial instrument and falls under the regulatory purview of the Federal Financial Supervisory Authority (BaFin). In France, cryptocurrency is also regarded as a financial instrument and businesses dealing with it must seek a license from Autorite des Marches Financiers (AMF).<sup>14</sup>

Other countries have been proactive in creating a regulatory framework for cryptocurrency. For instance, Malta became the first country in the whole world to develop a comprehensive set of regulations for cryptocurrency in 2018. This includes rules about initial coin offerings (ICOs) and exchanges dealing with cryptocurrencies. Cryptocurrency, however, has been taken more cautiously by some European nations. In the same year, European Central Bank (ECB) called for comprehensive regulation of cryptocurrency. It commented that an increase in the use of this kind of currency could destabilize the financial sector.

---

<sup>14</sup> Uncovering the Truth: Bitcoin Capital Review – Legit or Scam? <https://www.keinwettreusten.de/uncovering-thetruth-bitcoin-capital-reviewlegit-or-scam/> (April 4, 2023, 6:29 PM)

### 1.4.3 Asia

The legal status of cryptocurrency varies across Asian states. While some states embraced digital currencies, others are more skeptical about them. Japan is considered to be one of the most progressive Asian countries regarding cryptocurrencies. What happened is that Japan legalized virtual currency as a means of payment through a legislation passed in 2017, thus there are now multiple exchanges trading digital coins making it one of the largest crypto-currency markets worldwide. A different Asian country that supports cryptocurrency is South Korea. In 2017, South Korea legalized cryptocurrency trading and accepted it as a legal tender. Nonetheless, the government has shown serious interest in fighting against illegal activities related to cryptocurrencies like money laundering and tax evasion over recent years. Steps are taken to regulate cryptocurrency such as registering exchanges and following AML and KYC regulations.

However, this is not the same as China's position on cryptocurrency. The Chinese government prohibited initial coin offerings in 2017 on grounds of fraudulent activities or financial risks. This is also coupled with government crackdowns on exchanges and mining activities involving cryptocurrencies within its borders.<sup>15</sup> To sum up, the situation regarding legality of cryptocurrencies in Asia is quite diverse. There are countries that have supported cryptocurrencies while some have been more cautious due to fear of financial risks and illegalities related to the same. It is likely that more countries will try to establish oversight mechanisms for cryptocurrencies given the growth trajectory of this industry over time.

### 1.4.4 Africa

In Africa, the subject matter of the cryptocurrency which is still new in the continent and varies territorially on its legal status. Some countries have embraced it fully, such that they have provided frameworks to regulate its use while others have banned its usage

---

<sup>15</sup> Peter Schiff Blames Too Much Government Regulation for Worsening, CRYPTOPOLITAN, <https://www.cryptopolitan.com/peter-schiff-blames-governmentregulation/> (April 4, 2023, 6:29 PM)

completely. The use of cryptocurrency is regulated by The Financial Sector Conduct Authority (FSCA), the country's financial regulatory body, and the same agency has regarded it as a financial product giving way to rules governing transaction, investment and taxation. Furthermore, South Africa's Reserve Bank in 2014 released white paper on virtual currencies where digital representation of value were acknowledged with potentiality of changing financial services.

Nonetheless, Nigeria has approached cryptocurrency with caution. Consequently, in February 2021, the Central Bank of Nigeria (CBN) directed and ordered financial institutions to not facilitate transactions that involved cryptocurrency. The prohibition ignited a furore from the crypto community who insisted on it by trampling upon new ideas and economic growth. Nonetheless, the CBN maintained its ground by citing money laundering as well as terrorism financing among other risks linked to digital currencies for instituting the ban. Other African countries including Algeria, Morocco and Egypt have made firm decisions against cryptocurrencies. These nations justified their actions by pointing out that there is no regulatory framework governing this market, thus making it susceptible to illicit activities.

### **1.4.5 South America**

From country to country, cryptocurrency regulations in South America are quite divergent. There are however a few countries which have opened their doors to digital currencies, while others have restricted them further. Nevertheless, majority of the South American nations have not yet set up legal frameworks for cryptocurrencies. For example, Brazil has no explicit laws on cryptocurrencies though it stated by the Central Bank of Brazil that Bitcoin and any other cryptos are not considered as fiat money. Additionally, Argentina is yet to define its stance on cryptocurrencies but tax agency has started requiring virtual currency platforms to submit records for levy purposes.

Unlike Colombia whose government has been proactive in dealing with digital currencies and regulating crypto activities. In 2021, the Colombian government enacted a law governing transactions of cryptocurrency exchanges calling for exchanges to get

registered by financial regulators and observe anti-money laundering and anti-terrorism financing measures. On the other hand, Venezuela created its own cryptocurrency referred to as Petro backed by oil reserves of this country. Nonetheless, Petro has had an adverse reception on the global stage attracting sanctions from United States.<sup>16</sup>

#### 1.4.6 Australia

Since 2017, cryptocurrency has been considered to be legal in Australia and regulated. In addition, cryptocurrencies are viewed as a property by the Australian government, which means they are liable to capital gains tax. Furthermore, cryptocurrencies are thought of as a financial product and hence comes under the jurisdiction of ASIC (Australian Securities and Investments Commission). For instance, there is regulatory framework that ASIC has developed for cryptos which includes licensing requirements for crypto exchangers and other service providers. To avoid double taxation on digital currencies and make it easier for companies to use them for transactions, legislation was enacted in 2018.

However, despite this regulatory framework, there have been fears of criminal activities such as money laundering as well as terrorism financing being conducted via cryptocurrency. Therefore, the Australian Transaction Reports and Analysis Centre (AUSTRAC) has put regulations in place requiring exchange platforms facilitating virtual currency trade to register with them in accordance with its AML/CFT guidelines.<sup>17</sup>

#### 1.4.7 India

Cryptocurrency is a type of digital or virtual currency that provides security through the use of cryptography and functions apart from the central banks. Cryptocurrencies have become globally popular in recent years including in India. Nonetheless, the legal

---

<sup>16</sup> который рассматривает запуск - Translation into English - examples, <https://context.reverso.net/translation/russianenglish/> (April 4, 2023, 6:29 PM)

<sup>17</sup> Is The Biden Administration Politicizing Crypto? <https://cryptonews.net/news/legal/20745892/> (April 4, 2023, 6:29 PM)

status of cryptocurrency in India has always been a problematic and thorny issue. The legal experts, investors and policymakers have engaged in heated debates about the legality of cryptocurrencies within the jurisdiction of India. The Reserve Bank of India (RBI), which is the country's central bank, has shown skepticism about using digital currencies by issuing warnings. In 2013, RBI issued a statement, warning citizens against using crypto-money due to risks like hacking attacks, loss of money and absence of regulation. In 2018 though, RBI forbade banks from transacting with persons or companies trading cryptocurrencies.<sup>18</sup>

The Hon'ble Supreme Court of India, however, discussed that the RBI's circular was "unconstitutional" and they struck it down in March 2020. This meant that the RBI had no concrete proof that cryptocurrencies could put the banking system at risk. The court further argued that the Indian cryptocurrency industry was hurt by the RBI circular which came at a time when it was still embryonic to say the least. It allowed crypto asset holders freedom on their use. Nevertheless, as much as this is a landmark case, it does not point out definitively whether or not cryptocurrencies are legal in India. On its part, the Indian government has not passed any specific legislation regulating cryptocurrencies. However, there have been statements indicating that such assets might be subject to regulation with reports surfacing of plans for an Indian Cryptocurrency Bill. Another major concern of the Indian Government regarding cryptocurrencies is their potential abuse in illegal activities like money laundering and terrorist financing.<sup>19</sup>

The government is concerned that cryptocurrencies have been used to finance illegal activities and wants to prevent such malafide use of the currencies. Another concern for the government is the likely effects of cryptocurrencies on India's economy. For instance,

---

<sup>18</sup> Han, Wencui and Larson, Eric C. (2022) "Teaching Case: The Initial Coin Offering Marketplace: A Data Analytic Case," *Journal of Information Systems Education*: Vol. 33 : Iss. 2 , 135-140. Available at: <https://aisel.aisnet.org/jise/vol33/iss2/4>

<sup>19</sup> Network, L.N. (2020) [updated] SC quashes RBI ban on banking services to cryptocurrency dealers [read judgment], *Live Law*. *Live Law*. Available at: <https://www.livelaw.in/top-stories/breaking-sc-quashes-reserve-bank-of-indias-ban-on-cryptocurrency-153427> (Accessed: April 5, 2023).

the prices can fluctuate from time to time leading to instability in financial systems due to their high volatility. It does not want any regulations it puts in place harming the Indian economy.<sup>20</sup> In India, there are no specific legislations that determine the legal status of cryptocurrency. The 1961 Income Tax Act applies to crypto transactions and cryptocurrencies are considered as “assets” for taxation purposes. Hence, any profits realized out of disposing off cryptos attract capital gains tax.<sup>21</sup> The Cryptocurrency and Regulation of Official Digital Currency Bill, 2021 will soon be heard by the Lok Sabha. The Bill seeks to “provide for a facilitative framework for creation of the official digital currency to be issued by the Reserve Bank of India”, according to the Lok Sabha bulletin dated November 23, 2021. Moreover, it aims at prohibiting any private cryptocurrencies in India except a few cases intended to foster underlying technology of cryptocurrency and its uses.<sup>22</sup>

Transactions in cryptocurrencies also attract the provisions of The Prevention of Money Laundering Act, 2002 (PMLA).<sup>23</sup> As per the PMLA, “reporting entities” such as banks, financial institutions, and intermediaries are required to maintain records of transactions and verify the identity of their clients. Moreover, reporting entities must report dubious deals to the relevant authorities under PMLA. Furthermore, Securities and Exchange Board of India (SEBI) regulates some aspects related to cryptocurrencies. In 2019, SEBI released a circular that stated that cryptocurrencies identified as securities would fall within its regulatory ambit. Therefore, any initial coin offerings (ICOs) which are classified as securities will have to conform with SEBI regulations. In conclusion, cryptocurrency is still

---

<sup>20</sup> Pancreatic Cancer Treatment in India: The Journey of Courage [https://www.reddit.com/user/treatcare/comments/126cini/pancreatic\\_cancer\\_treatment\\_in\\_india\\_the\\_journey/](https://www.reddit.com/user/treatcare/comments/126cini/pancreatic_cancer_treatment_in_india_the_journey/) (April 4, 2023, 6:29 PM)

<sup>21</sup> Income Tax Act, 1961: A comprehensive overview -iPleaders <https://blog.iPLEaders.in/incometax-act-1961-a-comprehensiveoverview/> (April 4, 2023, 6:29 PM)

<sup>22</sup> Hildreth, N. (2021) Cryptocurrency bill 2021: The road ahead - fintech - India, Cryptocurrency Bill 2021: The Road Ahead - Fin Tech - India. Lumiere Law Partners. Available at: <https://www.mondaq.com/india/fintech/1145012/cryptocurrency-bill-2021-the-road-ahead> (Accessed: April 5, 2023)

<sup>23</sup> Fintech Primer - II <https://www.argus-p.com/paperspublications/thoughtpaper/ntech-primer-ii/> (April 4, 2023, 6:29 PM)

at a stage where it is evolving in terms of its legal status in India. However, while the Supreme Court has given approval on using or trading in cryptocurrency, there hasn't been any government enactment for specific legislation governing virtual currency transactions yet. However, existing laws and regulations, such as the Income Tax Act and the Prevention of Money Laundering Act, apply to transactions involving cryptocurrencies, and the SEBI has issued guidelines on certain aspects of cryptocurrencies. It is important for users and investors in India to stay updated on the latest developments in this area to ensure compliance with the applicable laws and regulations. Even in March, 2023 the Central Government notified the activities when carried out for or on behalf of another natural or legal person in the course of business as an activity comes under the ambit of PMLA.<sup>24</sup>

In addition to legal and regulatory concerns, there are also technological and operational challenges associated with the use of cryptocurrencies. One of the main challenges is the lack of awareness and understanding among the general public about cryptocurrencies. Many people are still sceptical about the safety and security of cryptocurrencies, and this can limit their adoption and usage. Another challenge is the lack of infrastructure to support the widespread use of cryptocurrencies in India. While there are a few cryptocurrency exchanges and wallets operating in India, they are still relatively new and face challenges in terms of scalability and reliability. In addition, there is a lack of clarity on the taxation of cryptocurrencies, and this can make it difficult for users and investors to comply with the applicable tax laws.

The Financial Intelligence Unit, India (FIU) plays a pivotal role in regulating cryptocurrency exchanges in India by focusing primarily upon combating money laundering and ensuring financial transparency. The FIU's mandate is crucial in curbing illicit activities such as terror financing and tax evasion and that can be facilitated by decentralized digital assets. By requiring crypto exchanges to adhere to the stringent Know Your Customer (KYC) and Anti-Money Laundering (AML) guidelines, the FIU effectively monitors and

---

<sup>24</sup> Ministry of Finance, CAB Order, F.No. CG-DL-E-07032023-244184 (Issued on March 7, 2023).

regulates transactions, even in the absence of a comprehensive legal framework. These exchanges are compelled to report suspicious transactions by maintaining oversight on high-value and cross-border transfers. The unit's vigilance ensures that cryptocurrency platforms cannot operate unchecked, thus it is indirectly regulating the space and preventing it from becoming a financial blind spot. Although, the FIU is not a direct policymaker for cryptocurrencies but its surveillance apparatus places de facto restrictions on how these assets can be traded by ensuring the alignment with India's broader financial security goals.<sup>25</sup>

In addition to the FIU's efforts, the Indian Finance Ministry has also adopted a significant role in curbing unregulated cryptocurrency activities by imposing a steep taxation regime on the digital assets. In the 2022 Union Budget, the Ministry introduced a 30% tax on gains from crypto transactions by treating them similarly to speculative assets.<sup>26</sup> This concerned measure, alongside the 1% Tax Deducted at Source (TDS) on every crypto transaction above a certain threshold, has not only dampened the speculative trading but also brought the crypto market under a form of indirect regulation. The heavy taxation dissuades the investors from engaging in frequent trading, by making it difficult for the crypto market to grow unbridled within the Indian territory. These financial obligations force exchanges and traders alike to adhere to strict compliance, ensuring that they cannot avoid the tax net. The combined impact of the FIU's enforcement of AML norms and the Finance Ministry's taxation measures signals the Indian government's approach towards indirectly regulating the subject matter of the cryptocurrencies and safeguarding the investors against their potential and probable misuses.

However, it is important to not ignore the potential benefits of cryptocurrencies despite these challenges. Cryptocurrencies offer a system where each transaction can be done securely and in a decentralized manner, which may come in handy in nations, such as

---

<sup>25</sup> ECONOMIC TIMES, <https://economictimes.indiatimes.com/markets/cryptocurrency/india-bans-foreign-crypto-platforms-like-binance-kucoin-what-should-investors-do-now/articleshow/106830654.cms?from=mdr> (last visited on Sept. 29, 2024).

<sup>26</sup> CLEAR TAX, <https://cleartax.in/s/cryptocurrency-taxation-guide#> (last visited on Sept. 29, 2024).

India where traditional banking systems are unreliable or inaccessible. Additionally, cryptos can enable cross-border transactions making it possible to increase international trade as well as commerce.<sup>27</sup> In conclusion, the legal status of cryptocurrency in India is still evolving and there are several challenges associated with their usage. However, Supreme Court's reversal of RBI's circular on has given a boost to cryptocurrency industry in India while governments' desire to regulate cryptocurrencies is the promising one. Users and investors must keep themselves updated with any changes and make sure they abide by the law. The existence of a sound regulatory framework and infrastructure for digital currencies could potentially revolutionize people's perception of money and financial transactions in India.

## 1.5 Cryptocurrencies in the Physical and Virtual Realms: A Dual Impact

The scope of cryptocurrencies tends to be enormous as it encompasses both real life and metaverse.

Cryptocurrencies are becoming more and more popular as a means of payment for goods and services in the real world.<sup>28</sup> Cryptocurrencies, such as bitcoin, have become acceptable forms of payment by several large online retailers like Tesla, SpaceX, Microsoft, Expedia and Overstock.com. Small businesses and traders are also accepting cryptocurrencies due to their safe and efficient customer payment service worldwide. Cross-border transactions have also been revolutionized by cryptocurrencies which provide an inexpensive and quick way to move money internationally especially for people living in countries with volatile currency units or limited access to traditional banking systems.<sup>29</sup> On the other hand, in the decentralized ecosystem or virtual world, cryptocurrencies are increasingly playing an important role in decentralization platforms.

---

<sup>27</sup> Weekly Round-Up #44 | Cryptocurrencies and DeDollarization: Navigating <https://www.linkedin.com/pulse/weekly-round-up-44-cryptocurrencies-dedollarization-navigating> (April 4, 2023, 6:29 PM)

<sup>28</sup> GLOBAL LEGAL INSIGHTS, <https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/thailand> (last visited on March 15, 2023).

<sup>29</sup> LEOFINANCE, <https://leofinance.io/@young-kedar/exploring-the-practical-use-of-cryptocurrency> (last visited on March 15, 2023).

These platforms allow users to create and trade digital assets such as virtual real estate and art.<sup>30</sup> Transactions on these platforms are facilitated by cryptocurrencies that enable users to buy, sell and trade virtual properties without centralized intermediaries. As of late, the metaverse has become the talk of town globally due to its amazing features, growth and Web3 connection. Some examples of NFTs-related case studies within the metaverse include:

### 1.5.1 Bored Ape Yacht Club (BAYC)

Bored Ape Yacht Club (BAYC) is a collection of Non-Fungible Tokens (NFTs), which are unique digital works of art on the Ethereum blockchain. These are hundreds of collectors who possess one out of 10,000 BAYC NFTs that have different attributes and levels of rarity.<sup>31</sup> The crypto community was hit by a storm when it came across BAYC, making these monkeys valuable assets that many people want. The Bored Ape Kennel Club is responsible for creating the Bored Ape Yacht Club in April 2021. Initially, only club members could buy the monkeys and in just several hours, all NFTs were sold out. At that time, they cost around \$250 each or 0.08 ETH (Ethereum). After the initial sale, BAYC exploded in popularity over the next few months with its apes acquiring a cult following on social media and their owners forming a tight-knit community. The community had organized yacht parties and charity auctions among other occasions to engage them as such.

Bored Ape Yacht Club NFTs are the ERC-721 tokens on Ethereum blockchain, meaning that no apes in this club are the same and cannot be traded one-to-one for another ape. The fur color, expression, and accessory of each ape make up its own set of attributes and rarity levels. The value of the apes in secondary markets is determined by the rarity of these attributes. The major hub for the community is the BAYC website. Other platforms on which they can be viewed and traded include OpenSea<sup>32</sup> as well as Bored Ape Kennel

---

<sup>30</sup> UPMORTAL, <https://upmortal.com/best-metaverse-crypto-what-is-metaverse-crypto/> (last visited on March 15, 2023).

<sup>31</sup> BAYC, <https://boredapeyachtclub.com/#/> (last visited on March 15, 2023).

<sup>32</sup> OPENSEA, <https://opensea.io/collection/boredapeyachtclub> (last visited on March 15, 2023).

Club Marketplace. Additionally, they can also serve as social media platform avatars or used in virtual worlds such as Decentraland or Twitter. As a result, Bored Ape Yacht Club has played a big role in shaping NFT market as well as overall crypto industry. These apes have been turned into very attractive valuable items that have gone for millions of dollars each on secondary exchanges. Moreover, BAYC has formed a community consisting people who collect these apes with passion for their values.

Other NFTs, for example, Pudgy Penguins and Cool Cats were inspired by the Bored Ape Yacht Club in adopting similar models. The triumph of the BAYC shows how NFTs can generate virtual assets that are valuable to the economy of art. The Crypto world is taken by storm with the popularity of Bored Ape Yacht Club as cultural phenomena. As for today, apes have become very valuable and high in demand possessions. The BAYC's success indicates how NFTs can create unique digital assets – which possess real values, thereby other projects have followed suit after them. It has built a community around its apes and club tenets. However, such an impact has already been produced on cryptocurrency on whole and the NFT market.

### 1.5.2 Crypto Punks

CryptoPunks<sup>33</sup> is a collection of 10,000 one-of-a-kind digital characters of NFTs, each having its own unique features and properties designed by Matt Hall and John Watkinson in 2017. These digital figures are stored on the Ethereum blockchain with their ownership being guaranteed by a smart contract. CryptoPunks have turned out to be one of the most valuable NFT collections globally since their launch. Originally, CryptoPunks were created as an amusing trial for digital art and the blockchain technology. They received motivation from early times in the internet world when they aimed at creating something that would replicate how unusual and disrespectful the web was during 1990s period. The characters were made using manageable pixel artistry and given various characteristics

---

<sup>33</sup> OPENSEA, <https://opensea.io/collection/cryptopunks> (last visited on March 15, 2023).

like hairdos, hats as well as accessories. When they were launched, anybody could get one free CryptoPunk.<sup>34</sup> However, as their popularity grew, they became a valuable commodity, with some selling for hundreds of thousands of dollars.

Each crypto punk has its own attributes including hairstyles, facial expressions, accessories, clothing etc. Collectors tend to chase after some rare qualities such as those making a character look like an alien or zombie. The rareness of any attribute is determined by factors such as how many punks have it and the number of times it has been used in the collection. CryptoPunks are owned and registered on the Ethereum blockchain by a smart contract.<sup>35</sup> It implies that each individual CryptoPunk ownership can be easily authenticated and exchanged, thus providing an unprecedented level of visibility and protection not seen before in the physical art world. CryptoPunks have become one of the most valuable NFT collections on earth with some going for millions of dollars. These include attributes such as their rarity, historical relevance among others all determine the worthiness of each CryptoPunk. For instance, some rarest CryptoPunks like those having alien or zombie attributes have been sold for more than \$7 million.

The effect of CryptoPunks has been huge on NFTs and digital art globally. Many other artists and creators have been motivated to experiment with blockchain technology as well as develop their collections of digital art by them. They also raised pertinent questions about what value there is in it, who owns digital art and how it can be protected or made profitable online today. CryptoPunks are an interesting demonstration of the way blockchain technology can be used to create and distribute digital art in a new and innovative manner. Their distinctively drawn appearance and rarity have made them one of the most expensive NFT collections globally, so they will continue to impact the world of art for years.

---

<sup>34</sup> DIGIPRIMA, <https://www.digiprima.com/blogs/roadmap-for-how-to-create-nft-like-crypto-punks> (last visited on March 15, 2023).

<sup>35</sup> BITDEGREE, <https://www.bitdegree.org/crypto/tutorials/what-is-a-smart-contract> (last visited on March 15, 2023).

### 1.5.3 Sandbox: The Metaverse

Sandbox Metaverse is an open virtual world where individuals can create, develop and monetize their own games.<sup>36</sup> Established in 2012, it employs the use of blockchain for true ownership over player creations as well as transactions conducted on the platform. This is unique about Sandbox Metaverse because it allows people to buy, sell or trade virtual lands and assets thereby creating a whole economy in game.<sup>37</sup> Blockchain technology underlies Sandbox Metaverse allowing real asset ownership within the game. Every game item is represented by a Non Fungible Token (NFT), which is a distinct digital asset verified on blockchain. It means that users can buy, sell and trade their NFTs with others, thus giving them total control over their assets.<sup>38</sup> Another unique aspect of the Sandbox Metaverse is that it allows users to make their own content.<sup>39</sup> The platform's tools and assets allow users to construct their own virtual worlds, then sell access to them to other players. A lively community has formed around this game in which gamers work together and demonstrate their creativity.

Apart from that, the Sandbox Metaverse has its own cryptocurrency called SAND, which is used for buying, selling and trading of assets in the game. It is an ERC-20 token that can be bought and sold on various crypto exchanges. The Sandbox Metaverse is significant because it is a new paradigm shift for gaming as well as virtual reality. This also uses a blockchain technology through which actual ownership of in-game assets may be claimed by players, thereby giving them more power over their virtual spaces unlike traditional ways where players do not have rights over their virtual properties nor can they monetize what they create.

The Sandbox Metaverse also goes beyond gaming into other areas. Its adoption of NFTs and cryptocurrencies could change

---

<sup>36</sup> THE PROGRAMMING GURU, <https://theprogrammingguru.com/the-programming-guru/> (last visited on March 15, 2023).

<sup>37</sup> NFT CALENDAR, <https://www.nftdropscalendar.com/nft-blog/the-role-of-nfts-in-virtual-real-estate> (last visited on March 15, 2023).

<sup>38</sup> METAPUNK, <https://www.metapunk.to/alan/blockchain-nft-gaming-trends-3ld> (last visited on March 15, 2023).

<sup>39</sup> SKALE, <https://skale.space/blog/ibloxx-studios-0xbattleground-offers-seamless-blockchain-battle-royale-gameplay-on-skale> (last visited on March 15, 2023).

commerce or exchange that has been taking place for long periods in conventional manners. As such, this platform places emphasis on user-generated content as well as cooperation hence transforming how we generate or disseminate content online. The Sandbox Metaverse has a number of advantages over traditional gaming models. It offers real asset ownership within the game. This means that players can buy, sell, and trade their assets, giving them more control and autonomy over their virtual worlds.

On top of this, the Sandbox Metaverse allows creators to make money from what they build. By enabling players to charge users who want to enter their virtual world, it is changing how content is made and sold on the internet. Lastly, there are many participants in the Sandbox Metaverse among whom there are a lot of players and developers.<sup>40</sup> In return, a thriving ecosystem coalesced around the game which sees collaboration among gamers with respect to their works. The Sandbox Metaverse is an alternative way of accessing games and virtual realities. Through adoption of blockchain technology it delivers real asset ownership within the game while providing a new model for producing and marketing digital goods. Its use of NFTs and cryptocurrency has the potential to disrupt traditional models of commerce and exchange. Moreover, its primary focus on user-generated content and collaboration could change how we create or share information online forevermore.

#### **1.5.4 Decentraland: The Metaverse**

Decentraland is a virtual reality platform built on blockchain technology.<sup>41</sup> It enables users to make, try out and monetize objects and applications in a decentralized 3D world.<sup>42</sup> Because of being open source, the Decentraland metaverse can be contributed by anyone for its development. The Decentraland metaverse will be investigated in which we have to look into its history, technical details and its impact

---

<sup>40</sup> ISOTOPIC, <https://isotopic.io/building-community-of-players-and-developers/> (last visited on March 15, 2023).

<sup>41</sup> SWITCHERE, <https://blog.switchere.com/top-5-best-metaverse-crypto-coins-to-buy-in-2023/> (last visited on March 15, 2023).

<sup>42</sup> THE PROGRAMMING GURU, <https://theprogrammingguru.com/the-programming-guru/> (last visited on March 15, 2023).

on the world. Decentraland was founded in 2015 by Esteban Ordano and Ari Meilich. Funding for the project came through an ICO that took place in 2017 where over \$24 million was raised. The Decentraland metaverse was launched officially during February 2020 with users being able to purchase and sell virtual land through their native cryptocurrency that is MANA. On the Ethereum Blockchain, the Decentraland metaverse leverages smart contracts to govern land ownership, transactions and other activities within the virtual community.<sup>43</sup> A unique digital asset representing ownership of that piece of land is a Non-Fungible Token (NFT).

Decentraland metaverse is where users can buy, sell or develop virtual land using MANA, the native coin of Decentraland. In addition to that, MANA can be used for purchasing items in the metaverse such as clothes, furniture and experiences.<sup>44</sup> The other thing is that there are avatars which one can modify and they will represent themselves in the digital world, further interaction with other inhabitants or attending events as well as taking part in various activities like playing games and so on. The content of the digital medium and computer-based software will not be the same, if there will be any chance of Decentraland metaverse evolution. It brings a new perspective on how people create and perceive things digitally. Even though it has only recently been launched officially, Decentraland's platform has shown itself to have multiple uses including virtual art galleries, concerts and even an online real estate market.

One key advantage of decentralization is its open-source attribute which pertains to Decentraland universe. This makes it possible for everyone to have a turn in its development therefore giving users sovereignty over their own digital properties and adventures. Furthermore, it gives artists, developers and entrepreneurs among others a chance to commercialize their creations, thereby creating rooms for innovation plus creativity. When it comes to blockchain technology and virtual reality, the

---

<sup>43</sup> CRYPTOGLUE, <https://www.cryptogluue.com/2023/01/26/how-to-create-a-cryptocurrency/> (last visited on March 15, 2023).

<sup>44</sup> COACHKRISTAL. <https://coachkristal.com/gspartners-bitcoin/> (last visited on March 15, 2023).

Decentraland metaverse is a new realm full of excitement.<sup>45</sup> It's characterized by being decentralized and open source, which means that it has brought about a new era with more control from users plus greater interactivity. This implies that its prospects for innovation and creativity are virtually limitless.

In online games and virtual worlds, cryptocurrencies are also being used enabling players to earn or trade them as in-game currency or rewards. For instance, Axie Infinity game allows players to breed rare digital creatures called Axies and obtain 'AXS' tokens for playing. Furthermore, cryptocurrencies offer possibilities for changing our way of interaction with digital content too. They enable creators of content to justly receive payments directly from users without passing through the traditional gatekeepers or intermediaries. Consequently, this helps authors retain more value from their work, while consumers can support creators directly without reliance on any centralized platforms or services at all. In conclusion, cryptocurrencies have several advantages including rapid, safe and cheap dealings and novel openings to generate, circulate and trade digital assets in both the real world and the metaverse. Nonetheless, they also pose their risks and challenges which users should understand as well as undertake necessary steps while using them.

## 1.6 A Spectrum of Cryptocurrencies: Understanding the Key Players

The different types of cryptocurrencies with examples are as follows:

### 1.6.1 Blockchain-Based Crypto:

Blockchain is a kind of distributed ledger technology that keeps records and stores all crypto transactions, including those for Bitcoin. It is a decentralized system using cryptographic methods to establish data reliability and security.<sup>46</sup> The term blockchain-based

---

<sup>45</sup> DECENTRALAND, <https://decentraland.org/> (last visited on March 15, 2023).

<sup>46</sup> *What is Blockchain Technology - IBM Blockchain | IBM*, IBM - DEUTSCHLAND | IBM, <https://www.ibm.com/topics/blockchain> (last visited Mar. 22, 2023).

cryptocurrencies are used to refer to tokens or coins that are secured on the blockchain network and its computer systems which validate them. Some of the examples include Bitcoin (BTC), Ethereum (ETH) and Ripple (XRP). These digital currencies have gained significant prominence in peer-to-peer transactions with the potential to disrupt many industries such as finance, supply chain management among others. The popular projects involving blockchain-based cryptocurrencies include:

## 1. Bitcoin (BTC)

Bitcoin is the most famous digital cryptocurrency that is sweeping across the globe. Its decentralization structure through a blockchain has brought revolution in the financial sector. This has far-reaching implications in various other sectors too.<sup>47</sup> The case study will offer an overview of bitcoin encompassing its history, technicalities and its impacts on the financial industry while underscoring why it's crucial to understand bitcoin as part of general knowledge about cryptocurrency. A cryptocurrency that was introduced in 2008 by an unknown person or group of people called Satoshi Nakamoto is Bitcoin. The decentralization of digital money into a currency with the help of encryption techniques to enable secure and unidentified transactions describes bitcoin. This makes it operate without control from any government or censorship through a single administration or central bank.<sup>48</sup>

To understand Bitcoin, one has to grasp its underlying technology known as Blockchain. A decentralized ledger that records all Bitcoin transactions is the blockchain. Each block is composed of verified transactions by network nodes, which are then added in chronological order to the blockchain. Any time a block enters the blockchain, it can neither be deleted nor changed. Therefore, this

---

<sup>47</sup> *Making sense of bitcoin, cryptocurrency and blockchain*, PWC, <https://www.pwc.com/us/en/industries/financial-services/fintech/bitcoin-blockchain-cryptocurrency.html> (last visited Mar. 22, 2023).

<sup>48</sup> Alexander S. Gillis, *What is Bitcoin and How Does It Work?*, WHATIS.COM (Nov. 15, 2021), <https://www.techtarget.com/whatis/definition/Bitcoin> (last visited Mar. 20, 2023).

blockchain becomes an unalterable and invincible account for all activities regarding Bitcoins. Mining is the process by virtue of which how Bitcoin gets created; miners employ powerful computers to solve complex mathematics problems and gain new bitcoins for their efforts at mining which takes place during this process—this ensures that new Bitcoins are included into the system at a regulated pace so as not to stretch excess supply beyond 21 millions of Bitcoins to be in circulation.<sup>49</sup> But it must be pointed out that bitcoin transactions are anonymous, though not completely untraceable. Transactions made on the Bitcoin blockchain can be seen by anyone, although all parties concerned stay unknown. To send or receive Bitcoins, one uses what is called a Bitcoin address which is similar to an email address. A user has an option of having several addresses which are made up of letters and numbers.

In the traditional financial industry, Bitcoin has caused disruptions through providing an alternative to centralized banking systems. This means that because it's decentralized, bitcoin becomes less prone to government regulations making it popular with those who don't trust conventional banks. Fast and cheap bitcoin transaction can occur from anywhere in the world without the need for a bank account or credit card. Also, Bitcoin has gained acceptance among merchants who can receive payments in Bitcoins without going through a payment processor, thus saving them money on fees and reducing chargeback risks.<sup>50</sup> However, some merchants have been reluctant about accepting bitcoin as payment due to its volatile value.

Bitcoin is the foremost and most popular cryptocurrency, but it's just one of many. There are thousands of cryptocurrencies in existence, with Bitcoin providing a good starting point for understanding them. Many other crypto currencies employ the same

---

<sup>49</sup> *Explained: What happens when all 21 million bitcoins are mined*, CNBCTV18.COM (Dec. 26, 2021), <https://www.cnbctv18.com/cryptocurrency/explained-what-happens-when-all-21-million-bitcoins-are-mined-11886092.htm> (last visited Mar. 20, 2023).

<sup>50</sup> Kim Lachance Shandrow, *5 Reasons Merchants Should Start Accepting Bitcoin Now* / *Entrepreneur*, ENTREPRENEUR (Sept. 4, 2014), <https://www.entrepreneur.com/money-finance/5-reasons-merchants-should-start-accepting-bitcoin-now/237026> (last visited Mar. 20, 2023).

core principles that are applied by Bitcoin through use of blockchain technology or organizations without any central control. Also, understanding Bitcoin is important because it helps in realizing how the digital currency has potential to disrupt traditional industries. Cryptocurrencies can be used for more than just financial transactions, and they have the potential to revolutionize industries such as healthcare, real estate among others.<sup>51</sup>

Bitcoin offers several advantages over traditional forms of currency. Firstly, it is decentralized, meaning no single entity like a government or bank controls it. This means that Bitcoin has greater resistance to censorship and higher security compared to conventional money. Secondly, Bitcoin transactions are swift and inexpensive. Because Bitcoin transactions occur on a decentralized network, there are no intermediaries involved such as banks or payment processors. Therefore, compared to traditional methods of payment, bitcoin transactions do not only take less time but also cost much less. Thirdly, Bitcoin is safer than the other currencies. This is because Bitcoin transactions are recorded on a decentralized ledger, making it impossible for hackers or another bad actor to target a central point of failure. Additionally, Bitcoin transactions are protected by advanced encryption methods that ensure their security and make them completely uncrackable. The last thing is that Bitcoin has the potential to change the economy. By its very nature, Bitcoin is not centralized and can be used by anyone in any corner of the world. This may impact millions of individuals who have no access to banking facilities as well as those with limited access to these services.

Bitcoin has also some disadvantages despite its many benefits. Firstly, it is an investment that involves high risk due to volatility of value. The price of a bitcoin can change drastically within hours. As such, investors may find it hard to speculate about this asset and hence it is perilous for the risk-averse people when they put their money into it. Furthermore, Bitcoin is not yet a widely accepted as a means of payment or the secondly, this remains an opinion of some but with more merchants accepting Bitcoin, majority of businesses are still

---

<sup>51</sup> *The Business Benefit of Using Cryptocurrency*, DELOITTE UNITED STATES, <https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html> (last visited Mar. 21, 2023).

non-accepting. This has therefore limited its use as currency and involved a lot of inconveniences when it comes to every day transactions. Finally, due to being decentralized, Bitcoin is not regulated by any central authority. However, this can be seen as one of the major lacunae since it does not have a safety net in case there is fraud or theft. Once Bitcoins have been stolen there is no way that they can be recovered leaving out those who are not tech-savvy or unwilling to stick to their own Bitcoin wallet safekeeping practices at peril of losing their investment.

To sum up, Bitcoin is unique digital currency that has the potential to change the major dynamics of the entire financial industry. Decentralization with blockchain technology introduced alternative for traditional banking systems making it very popular among people from other sectors till now. In order to comprehend the potential that cryptocurrencies have in disrupting traditional industries, it is important to first understand how bitcoin functions. Despite having numerous advantages, Bitcoin also has several disadvantages which investors should put into consideration before investing in BTC or any other cryptocurrency.

## 2. Ethereum (ETH)

Ethereum is an open-source, blockchain-based computing platform that can be used to build smart contracts and distributed applications (DApps). In 2014, it was founded by Vitalik Buterin, who saw the potential for blockchain technology to go beyond being a mere currency like Bitcoin.<sup>52</sup> The growth of the blockchain industry has been strongly influenced by Ethereum. The blockchain of Ethereum is similar to that of Bitcoin as in that it keeps track of all transactions using a public ledger. Nonetheless, Ethereum's blockchain is more adaptable since it supports smart contracts and

---

<sup>52</sup> Jake Frankenfield, *What Is Ethereum and How Does It Work?*, INVESTOPEDIA (Feb. 24, 2016), <https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 21, 2023).

DApps development.<sup>53</sup> Smart contracts are self-executing contracts that automatically execute the terms of an agreement when certain conditions are met. DApps are decentralized apps built on top of the Ethereum blockchain that can do many things. The native cryptocurrency for Ethereum is called Ether (ETH) which is utilized as payment for transaction fees and also to incentivize miners to validate transactions. Like Bitcoin, Ethereum used a consensus mechanism known as Proof of Work (PoW) to verify transactions and add new blocks to the blockchain. Nevertheless, Ethereum now has transitioned from Proof-of-Work (PoW) to Proof-of-Stake (PoS), which has made Ethereum more efficient and environmentally friendly.<sup>54</sup>

The development of the blockchain industry has been greatly impacted by Ethereum. Thus, with smart contracts and DApps as part of its innovation, new decentralized services and applications that were not there before have come up. Presently we are witnessing the rise of decentralized finance (DeFi) apps which allow users' access financial services without needing banks or other traditional intermediaries. Additionally, it allows non-fungible tokens (NFTs) to be created on the network; NFTs are unique digital assets that can only exist on the chain itself. NFTs have become increasingly popular in the art and entertainment industries, with many artists and musicians using them to sell unique digital content directly to their fans.

Ethereum's flexibility and capacity to support development of smart contracts and DApps have made it a major platform for creating decentralized applications and services. Besides, transitioning from PoW to PoS consensus mechanism has made the network more effective and environmentally friendly, thereby increasing its worth. Additionally, focusing on DeFi and NFTs by

---

<sup>53</sup> Karin Kelley, *What is Ethereum? Explained With Features and Applications / Simplilearn*, SIMPLILEARN.COM (May 12, 2020), <https://www.simplilearn.com/tutorials/blockchain-tutorial/what-is-ethereum> (last visited Mar. 20, 2023).

<sup>54</sup> Jake Frankenfield, *What Is Ethereum and How Does It Work?*, INVESTOPEDIA (Feb. 24, 2016), <https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 27, 2023).

Ethereum has opened up new opportunities for creativity in finance and entertainment industries. As the utilization of Blockchain technology continues growing, it seems likely that Ethereum will remain a key player in this field.

There are several benefits that come with Ethereum as a blockchain platform vis-a-vis others. Firstly, it is capable of supporting many decentralized services and applications through smart contracts as well as DApps among other things. This has given rise to DeFi, NFTs, and many other sectors that were not possible before now. Secondly, Ethereum's shift to PoS consensus mechanism is has made the network more efficient as well as being environment friendly. In doing this it consumes less energy required in validating transactions and adding new blocks to the chain.<sup>55</sup> Last, but not the least, Ethereum boasts one of the largest and most vibrant communities in the entire blockchain space. This fostered a rich variety of platforms, tools, environments for developers who create on its infrastructure leading to an overall success of the network.<sup>56</sup>

One of Ethereum's most noticeable attributes is its provision of smart contracts. These self-executing agreements are drafted in a code and can be used to automate complicated financial transactions and create decentralized applications (DApps). Ethereum Virtual Machine (EVM) is the place where smart contracts run on Ethereum network. EVM allows programmers to develop smart contracts using different programming languages like Solidity, Vyper among others. Ethereum supports decentralized application development. These are applications that operate within a decentralized system such as the Ethereum blockchain. They aim to be more secure, transparent and resistant against censorship compared with traditional applications. Some of the ways through which DApps can be used include carrying out financial transactions, social media and gaming activities. A few

---

<sup>55</sup> Stephen Graves Robert Stevens, *What Is 'The Merge'? Ethereum's Move to Proof of Stake - Decrypt*, DECRYPT (Sept. 15, 2022), <https://decrypt.co/resources/what-merge-ethereum-move-proof-stake/> (last visited Mar. 22, 2023).

<sup>56</sup> Jake Frankenfield, *What Is Ethereum and How Does It Work?*, INVESTOPEDIA (Feb. 24, 2016), <https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 22, 2023).

examples of popular DApps include Uniswap, Aave, and Compound which are decentralized finance (DeFi) platforms enabling cryptocurrency lending, borrowing and trading.<sup>57</sup>

Ethereum's open and decentralized nature comes with many risks and challenges. One of the biggest of these is scalability. As more applications are developed on Ethereum, the network transacts more transactions that can mean lower speed of transaction and higher gas fees. Additionally, there is a risk for smart contract vulnerabilities. Any mistakes or bugs in the codes of Smart contracts could lead to very serious consequences including loss of funds or exposure of private data. Besides that, globally the governments are grappling with policies to regulate cryptocurrencies and DApps, hence Ethereum faces regulatory risks. The danger exists where governments may place restrictions on the use of Ethereum or other cryptocurrencies. Moreover, Ethereum is a powerful platform which has a potential to transform various sectors such as finance and gaming industry through their provided services. By supporting smart contracts and DApps, Ethereum has opened up new possibilities for decentralized applications as well as automating complex financial transactions. Despite that, Ethereum also confronts some obstacles such as scaling issues and regulatory risks but that does not undermine its importance in the blockchain industry because it still holds good future.

### 3. Ripple (XRP)

Ripple is a cryptocurrency payment protocol that makes use of blockchain technology to offer fast, safe and cheap cross-border payments. Ripple Labs designed the platform in 2012 with an aim of addressing inefficiencies and high costs experienced in traditional international payment systems. The Ripple's native cryptocurrency

---

<sup>57</sup> Jake Frankenfield, *Decentralized Applications (dApps): Definition, Uses, Pros and Cons*, INVESTOPEDIA (Feb. 6, 2018), <https://www.investopedia.com/terms/d/decentralized-applications-dapps.asp> (last visited Mar. 15, 2023).

that is XRP acts as a linking currency for cross-border transactions.<sup>58</sup> Ripple's blockchain technology aims at facilitating real time cross border payments, thus enabling financial institutions settle transactions faster. Unlike traditional payment systems that take days to be settled, Ripple has its transactions settled within seconds. This is possible with the use of ripple consensus ledger which validates and confirms transactions in real-time.<sup>59</sup> Ripple adopts a unique consensus algorithm known as Ripple Protocol Consensus Algorithm (RPCA) for transaction validation. RPCA is different from other consensus algorithms such as Bitcoin's Proof of work (PoW) algorithm which rely on miners to validate transactions. Instead, it uses a network of trustworthy validators to authenticate transactions, thus making it faster and more efficient compared to other blockchain systems. XRP being the cryptocurrency used by Ripple for bridging between fiat currencies across borders, when a financial institution intends to send out money across borders, it first converts its money into XRP which acts a bridge between two currencies.<sup>60</sup> Cross-border payments have been greatly influenced by Ripple especially in the field of finance industry. In order to enhance their cross-border payment services, many financial institutions are going for this fast and efficient payment system. Other companies in the financial industry like Santander and American Express have also taken Ripple's blockchain technology to improve their payment systems. Moreover, Ripple has been controversial as it was centralized unlike other blockchains. Although more efficient than other blockchain algorithms, Ripple's consensus algorithm has been criticized for being too centralized because all network validators are controlled by one

---

<sup>58</sup> Contributors to Wikimedia projects, *Ripple (payment protocol)* - *Wikipedia*, WIKIPEDIA, THE FREE ENCYCLOPEDIA (Aug. 6, 2005), [https://en.wikipedia.org/wiki/Ripple\\_\(payment\\_protocol\)](https://en.wikipedia.org/wiki/Ripple_(payment_protocol)) (last visited Mar. 21, 2023).

<sup>59</sup> CB Insights, *How Blockchain Could Disrupt Banking*, CB INSIGHTS RESEARCH (Oct. 18, 2022), <https://www.cbinsights.com/research/blockchain-disrupting-banking/> (last visited Mar. 22, 2023).

<sup>60</sup> Kate Rooney, *Ripple wants a piece of the global payment system while it fights a cryptocurrency 'holy war'*, CNBC (Jan. 8, 2019), <https://www.cnbc.com/2019/01/07/ripple-wants-a-piece-of-the-global-payment-system.html> (last visited Mar. 23, 2023).

firm called as Ripple Labs. This has raised concerns about security and decentralization of the Ripple network.

Ripple's inclination in the economic domain as well as its unique consensus algorithm makes it a technology that should be known. By using XRP as an intermediary currency for international transactions, Ripple can completely change the way international payments are made. The comprehension of Ripple and what it offers is important for any person aspiring to improve cross border payments and innovate in the financial services. There are several advantages to using Ripple compared to traditional payment systems. Firstly, it has a swift and efficient payment system which reduces time and cost of making cross-border transactions. Secondly, by using XRP as an intermediate currency there would be no need to involve many currency conversions hence reducing the time and costs of cross-border transactions even more. Finally, ripple's blockchain technology is more efficient and quicker than other blockchain systems thus making it preferred by financial institutions that want to enhance their payment systems.<sup>61</sup> Hence, many will choose Ripple because of its swift and efficient payment system as well as its unique consensus algorithm as this is often used by financial institutions wishing to improve their services regarding cross-border payments. This could potentially alter the way international payments are done through the utilization of XRP, hence it's worth understanding. However, concerns about the ripple network being centralized, underscore the need for ongoing innovation and improvement in blockchain technology for finance.

#### 4. Polkadot (DOT)

The platform called as Polkadot<sup>62</sup> does not only transfer cryptocurrencies between various blockchains but allows for the movement of any data type whatsoever between blockchains, since it is decentralized. While creating a network of specialized blockchains known as parachains that can communicate and work together

---

<sup>61</sup> *Ibid.*

<sup>62</sup> *What Is So Special About Polkadot?*, BLOCKCHAIN-BASED TIMESTAMPING | ORIGINSTAMP, <https://originstamp.com/blog/what-is-so-special-about-polkadot/> (last visited Mar. 25, 2023).

fluidly, this platform seeks to solve scalability, interoperability and security problems inherent in existing blockchains. Polkadot is an architecture that takes care of all limitations which exist in current blockchain networks like Bitcoin or Ethereum by creating a scalable, secure and interoperable web of specialized blockchains. The platform operates with a relay chain which acts as the central hub tying together all parachains. Parachains are specialized blockchains that can be customized to meet different use cases' specific requirements. Each parachain may have its own token economics, smart contract language, governance model and consensus algorithm too. This provides developers with opportunity to design tailored blockchains for particular purposes such as finance or gaming or identity management.<sup>63</sup>

Polkadot utilizes a new and distinct way of arriving at an agreement known as Nominating Proof of Stake (NPoS) which is engineered to strike a balance between security, decentralization, and scalability. Token owners in NPoS can nominate validators who secure the network and validate transactions. Validators are motivated by rewards to be honest and fair in their conduct since they may lose their position if they behave otherwise. The potential that Polkadot has for the blockchain space is immense, this includes solving scalability problems and bringing about inter-operations amongst different blockchains. This will make it possible for Polkadot to have a network of specialized blockchains meaning faster transactions at lower costs enabling other new use cases. In fact, Polkadot has been embraced by numerous players within the blockchain community who continue developing on its platform. Notably:

- Acala: A decentralized finance (DeFi) platform that allows cross-chain interoperability and stablecoin creation.
- Moonbeam: A smart contract platform where developers can construct Ethereum-compatible applications on Polkadot.

---

<sup>63</sup> Polkadot Parachains: A Deep Dive into their Benefits and Functionality, New Tech (Feb. 24, 2023), <https://newtech.finance.blog/2023/02/24/benefits-of-polkadot-parachains/> (last visited Mar. 21, 2023).

- Chainlink: A decentralized oracle network giving safe and reliable inputs/outputs from data for smart contracts on Polkadot.

Polkadot is an important advancement in the blockchain industry as it resolves many of the issues related to scalability, interoperability and security that have been holding back acceptance of blockchain technology. Developers, investors and businesses that intend to build on Polkadot or exploit its capabilities must understand it.<sup>64</sup> Polkadot has an architecture that allows for the development of specialized blockchains, which can help to reduce costs, improve efficiency and enable new applications. Polkadot is a platform for developers to create decentralized apps that are more scalable, secure and interoperable than current blockchain networks. Traditional investors can bank on Polkadot which may disrupt existing industries and lead to the birth of new business models. Businesses may use the capabilities of Polkadot in order to enhance their operations, cut down costs and add new sources of income.<sup>65</sup> Polkadot is a decentralized platform for transferring any kind of data between different chains. Its distinctive structure, consensus method and mode of governance address existing scalable, interoperability and security problems in blockchain networks. An array of special purpose blockchains can be created by Polkadot which leads to new uses cases as well as better efficiency resulting in cost reduction. For developers, investors or businesses who seek to exploit this ground breaking platform, understanding it is crucial.

## 5. Binance Coin (BNB)

Binance Coin (BNB)<sup>66</sup> is the native cryptocurrency of the world's biggest exchange based on traded volumes and that is

---

<sup>64</sup> *The Role of Polkadot in the Interoperability of Blockchain Networks - TechStory*, TECHSTORY (Mar. 21, 2023), <https://techstory.in/the-role-of-polkadot-in-the-interoperability-of-blockchain-networks/> (last visited Mar. 21, 2023).

<sup>65</sup> Wendy Henry & Linda Pawczuk, *Blockchain: Ready for business*, DELOITTE INSIGHTS (Dec. 7, 2021), <https://www2.deloitte.com/us/en/insights/focus/tech-trends/2022/blockchain-trends.html> (last visited Mar. 23, 2023).

<sup>66</sup> *About*, BINANCE, <https://www.binance.com/en/about> (last visited Mar. 27, 2023).

Binance. It was launched in 2017 by Changpeng Zhao and Binance team as an ERC-20 token on the Ethereum blockchain before moving to its own blockchain called Binance Smart Chain. In the Binance platform, it is a utility token used for trade fees, listing fees, transaction fees and other services. From its inception, this digital currency has grown enormously to become one of the largest cryptocurrencies by market capitalization today. It was founded by Changpeng Zhao, a Chinese-Canadian software developer and entrepreneur in 2017. Before starting his exchange, he had worked in many places such as Blockchain.info and OKCoin which are prominent companies in the cryptocurrency space. It quickly became popular because of its low fees, user-friendly interface and wide range of trading pairs. Within a few months, the platform turned into one of the biggest exchanges globally with over \$1 billion daily trading volumes. To fund the development of the Binance exchange, an initial coin offering (ICO) took place in July 2017 where 100 million BNB tokens were sold amounting to \$15 million.<sup>67</sup> The sale achieved tremendous success as it was sold out within minutes raising more money than planned by the team at first. Initially, BNB was created as an ERC-20 token on the Ethereum blockchain but subsequently, in April 2019, Binance launched its blockchain referred to as Binance Smart Chain which led to the migration of BNB from the Ethereum network.

In the case of BNB within the larger cryptocurrency world at large, there are several use cases and applications within the Binance ecosystem. The most common use case involves trading fees where users can opt to pay their trading costs using BNB instead of trading pairs and get discounted rates on their trades. This discount starts at 25% in the 1st year and decreases thereafter meaning that users are encouraged to hold BNB long-term basis. Moreover, apart from trading fees, listing fee also requires payment through BNB due to which various projects list their tokens on Binance. Additionally, payments for numerous services including decentralized exchange

---

<sup>67</sup> CFI TEAM, *Binance Coin (BNB)*, CORPORATE FINANCE INSTITUTE (Dec. 6, 2022), <https://corporatefinanceinstitute.com/resources/cryptocurrency/binance-coin-bnb/> (last visited Mar. 22, 2023).

(DEX), token launchpad, and blockchain explorer offered by Binance are made with this altcoin.

BNB started off slow, with its price staying around \$0.10 for a couple of months after it was launched. However, when Binance grew in popularity, the demand for BNB rose and so did the price. By January 2018, the value of BNB was at \$24 which translates to an increase of 24,000% within a matter of months. This was followed by a big market correction in 2018 whereby BNB also dropped in price to about \$4 by December that year.<sup>68</sup> Since then, there have been several huge swings in the value of BNB that saw it hit all-time high trading at \$690 on May 2021. Many things contributed to this rise such as expansion of Binance exchange, favorable public opinion towards Binance Smart Chain besides more acceptance of BNB as a medium of exchange through which most crypto coins or tokens are traded. Nevertheless, starting from thereon, up to now the cost has gone down and currently stands at about 400 US Dollars each, even though that is still very far from where it used to trade early on.<sup>69</sup> Binance Coin (BNB) is a utility token integral to the functioning of the ecosystem Binance operates on. Having grown significantly since its inception, this token falls among the top cryptocurrencies based on market capitalization today. Being volatile over time with some important movements but generally high-performing as well.

## 1.7 Meme Coins or Tokens:

Meme coins also referred as meme tokens are digital currencies that are influenced by memes on the internet and popular culture. They hardly hold any value outside of social media or fun-related purposes.<sup>70</sup> Meme coins have become popular due to their low prices

---

<sup>68</sup> *The Evolution of BNB: From Fees to Global DeFi Infrastructure* / Binance Blog, BINANCE BLOG, <https://www.binance.com/en/blog/ecosystem/the-evolution-of-bnb-from-fees-to-global-defi-infrastructure-421499824684901925> (last visited Mar. 22, 2023).

<sup>69</sup> *Binance Coin (BNB) Price Prediction 2025-2030: Can BNB reach \$3k by 2025?*, AMBCRYPTO, <https://ambcrypto.com/binance-coin-bnb-price-prediction-26/> (last visited Mar. 21, 2023).

<sup>70</sup> *Defining A Meme Coin: How Meme Coins Are Gaining Utility*, <https://www.outlookindia.com/>,

and association with online culture. Examples of these meme coins include Dogecoin (DOGE), Shiba Inu (SHIB), Baby DogeCoin etc. While some argue that they do not have any practical use other than being just another expression of meme culture, they enjoy a huge following and have become popular speculative investments. The case studies on most famous Meme coins or tokens-based cryptocurrencies are as follows:

### 1.7.1 Dogecoin (DOGE)

Dogecoin is a cryptocurrency created as a joke in 2013 by Billy Markus and Jackson Palmer. Its name and logo were derived from the popular “Doge” internet meme, which featured a Shiba Inu dog with comic sans captions.<sup>71</sup> Nonetheless, Dogecoin has attracted a large number of followers globally and established itself as one of the most prominent digital currencies on the planet. To provide an all-rounded coverage of Dogecoin in this context, we shall consider its history, technicalities, as well as its influence on the crypto industry. Billy Markus was the programmer behind Dogecoin, while he was living in Portland, Oregon at December 2013 with Jackson palmer being in Sydney, Australia as a marketer for Adobe systems software company.<sup>72</sup> They used to share things about Doge memes that were quite popular then and so they decided to create their own digital currency which would be friendly just like others of tweets. The currency swiftly gained steam among users on social media platforms such as Twitter or Reddit, becoming one of the world’s most recognizable cryptocurrencies.

Like Bitcoin and many other virtual currencies, Dogecoin is based on the same fundamental principles. It makes use of a decentralized network to process financial transactions and keep an

---

spotlight/defining-a-meme-coin-how-meme-coins-are-gaining-utility-news-214204 (last visited Mar. 23, 2023).

<sup>71</sup> Grace Kay, *The history of Dogecoin, the cryptocurrency that surged after Elon Musk tweeted about it but started as a joke on Reddit years ago*, BUSINESS INSIDER (Feb. 9, 2021), <https://www.businessinsider.com/what-is-dogecoin-2013-12> (last visited Mar. 21, 2023).

<sup>72</sup> Contributors to Wikimedia projects, *Dogecoin - Wikipedia*, WIKIPEDIA, THE FREE ENCYCLOPEDIA (Dec. 14, 2013), <https://en.wikipedia.org/wiki/Dogecoin> (last visited Mar. 23, 2023).

open record of all trades within it. Each block in the Dogecoin blockchain consists of a set of transactions that are given credibility by network nodes before being inserted into the public ledger in chronological order. There are several major technical differences between Dogecoins and other cryptocurrencies. Firstly, Dogecoin has a much quicker time for block generation than Bitcoin, meaning that transactions will get processed far faster. Secondly, Dogecoin has a larger total supply compared to Bitcoins as there is 10000 coins available per block as opposed to 21 million on Bitcoins.<sup>73</sup> Finally, dogecoin uses an alternate hashing algorithm from bitcoin which makes it more accessible towards miners with less powerful computers.

Since its inception, Dogecoin has had a significant influence on the cryptocurrency sector. It has helped to increase awareness about cryptos and introduced numerous people to digital money. Similarly, donations have been made through this currency towards various noble causes such as paying for Jamaican bobsled team's trip to Sochi winter games of 2014 and providing clean drinking water in Africa's hinterlands.<sup>74</sup> Dogecoin has, in recent times, been talked about a lot due to its price fluctuations. This means that its value has gone up and down suddenly many times, making some people doubt whether it can be viewed as a long-term investment with seriousness. Nonetheless, this currency continues to receive support from the community of loyalists who believe in it.

Joke-based Dogecoin has however become very huge in crypto world. In order to understand the broader spectrum of cryptocurrencies, it is important to comprehend Dogecoin. The popularity of Dogecoin has also helped to raise the profile for cryptocurrencies and led to many other "altcoins" being created with

---

<sup>73</sup> *How Many Dogecoins Are There? | Total Number Of Dogecoins*, ONLINE TRADING WITH SMART INVESTMENT APP | CAPITAL.COM, <https://capital.com/how-many-dogecoins-are-there-in-the-world> (last visited Mar. 24, 2023).

<sup>74</sup> Alex Hern, *It's bobsleigh time: Jamaican team raises \$25,000 in Dogecoin*, THE GUARDIAN (Jan. 20, 2014), <https://www.theguardian.com/technology/2014/jan/20/jamaican-bobsled-team-raises-dogecoin-winter-olympics> (last visited Mar. 22, 2023).

unique properties and use cases too.<sup>75</sup> Similarly, there are several other digital currencies that have followed suit as far as social responsibility is concerned by putting community engagement at the center of their activities like dogecoin did. Besides, Doge's technical disparities from other altcoins point-blank show that how cryptocurrency industry can evolve through innovation and experimentation. Just like all other cryptocurrencies, Dogecoin may be viewed as better than traditional forms of money in various ways. First, it is decentralized which implies that it is not under the control of one entity like a government or bank making it more censorship-resistant and secure compared to the traditional money. Also, transactions in Dogecoin are swift and cheap. This eliminates any need for intermediaries such as banks or payment processors in Dogecoin transactions since everything happens on a decentralized network.<sup>76</sup>

Dogecoin is a cryptocurrency that began as a joke but has gained significant popularity in recent years. Its fun and light-hearted nature has attracted a large user base who have contributed to its wider acceptance and consequent value appreciation. However, Dogecoin has received criticism for its lack of technical innovation and absence of practicality but still managed to find an exclusive niche for itself within the cryptocurrency market. A good community base and strong branding set it apart from other digital currencies attracting people who would not normally be interested in crypto-currencies as well as their investment possibilities.<sup>77</sup> As with any cryptocurrency investment, you should always know your risks before investing into

---

<sup>75</sup> Taylor Locke, *Elon Musk continues to tweet about altcoins like baby dogecoin—but investors should tread very carefully*, CNBC (July 13, 2021), <https://www.cnbc.com/2021/07/13/what-are-altcoins-elon-musk-tweets-about-baby-dogecoin-shiba-inu.html> (last visited Mar. 22, 2023).

<sup>76</sup> Jake Frankenfield, *Cryptocurrency Explained With Pros and Cons for Investment*, INVESTOPEDIA (July 29, 2013), <https://www.investopedia.com/terms/c/cryptocurrency.asp> (last visited Mar. 23, 2023).

<sup>77</sup> Albi Nani, *The doge worth 88 billion dollars: A case study of Dogecoin*, 2022 CONVERGENCE: THE INTERNATIONAL JOURNAL OF RESEARCH INTO NEW MEDIA TECHNOLOGIES 135485652110704, XXXX, <https://doi.org/10.1177/13548565211070417> (last visited Mar. 22, 2023).

Dogecoin, especially after doing a thorough research on it. Its high volatility and unclear use cases make this a risky investment for many yet some have seen this as just another fun way to spend some extra cash while possibly making a lot back if they were lucky enough. In general, Dogecoin has shown that it is possible for cryptocurrencies to be more than just serious financial instruments. By being so humorous yet together as one, it became possible for people who are new to digital currencies to explore the field and learn about the potential of this technology. The way that Dogecoin and other cryptocurrencies develop will be interesting as the cryptocurrency market evolves over time.

### 1.7.2 Shiba Inu (SHIB)

Shiba Inu (SHIB) is a decentralized cryptocurrency project built on Ethereum Blockchain aiming at fostering a community-based and decentralized ecosystem. It was launched by someone known as Ryoshi anonymously in August 2020.<sup>78</sup> The reason behind this project's name and logo was because of the Shiba Inu dog breed which became famous due to the Doge meme from Dogecoin's perspective. Shiba Inu (SHIB) started as a meme coin with little value but increased in popularity in early May 2021, when the prices of alternative coins soared in the cryptocurrency market. May 10, 2021 was the day SHIB hit its highest ever price at \$0.0000388 with a market cap of over \$12 billion.<sup>79</sup> As of September 2021, SHIB has a market capitalization of about \$3 billion and is trading around \$0.0000078.

The total supply for Shiba Inu tokens is one quadrillion tokens which were distributed through liquidity provision, airdrops and

---

<sup>78</sup> The Investopedia Team, *What Is Shiba Inu (SHIB) in Cryptocurrency, and How Does It Work?*, INVESTOPEDIA (Nov. 1, 2021), <https://www.investopedia.com/shiba-inu-shib-5207903> (last visited Mar. 22, 2023).

<sup>79</sup> *Shiba Inu Beats Bitcoin In Popularity In 2021; Gets 43 Million More Views*, [HTTPS://WWW.OUTLOOKINDIA.COM/](https://www.outlookindia.com/), <https://www.outlookindia.com/web-site/story/shiba-inu-beats-bitcoin-in-popularity-in-2021-gets-43-million-more-views/407231> (last visited Mar. 26, 2023).

burning among other ways.<sup>80</sup> Shiba Inu (SHIB) aims to create several use cases within a decentralized ecosystem including:

**ShibaSwap:** This is an Ethereum-based decentralized exchange where users can trade cryptocurrencies and earn rewards through liquidity provision.

**Shib-Army:** Dedicated to raising awareness about SHIB and its use cases.

The Shiba Inu (SHIB) is a decentralized cryptocurrency project which started as a meme coin inspired by the Dogecoin meme. Nevertheless, the purpose of this project is to establish a community-driven and decentralized ecosystem that has many use cases such as a decentralized exchange, community-driven initiatives, and NFTs. Its price has been highly volatile since inception but it also boasts of a loyal support base.

### 1.7.3 Babydoge Coin

Baby Doge Coin is an offshoot baby dogecoin created from the popular meme-based cryptocurrency, Dogecoin.<sup>81</sup> It was created on June 1st, 2021 and quickly became a favorite among investors due to its cuteness factor in branding and playful marketing. The total number of Baby Doge coins stands around 420 quadrillion tokens, thus indicating that its total supply is much higher compared to that one of Dogecoin.<sup>82</sup> Baby Doge Coin operates primarily on the Binance Smart Chain (BSC), which is a highly scalable blockchain

---

<sup>80</sup> The Investopedia Team, Around 41% of shiba inu's total supply is burned, Business Insider (Sept. 6, 2022), <https://www.businessinsider.in/cryptocurrency/news/10-shiba-inu-coin-holders-own-71-of-the-meme-tokens-total-supply/articleshow/87347866.cms> (last visited Mar. 24, 2023).

<sup>81</sup> Manas Tiwari, What is Baby Doge? Meet Elon Musk's new favourite cryptocurrency, India Today (July 2, 2021), <https://www.indiatoday.in/technology/news/story/what-is-baby-doge-meet-elon-musk-s-new-favourite-cryptocurrency-1823020-2021-07-02> (last visited Mar. 26, 2023).

<sup>82</sup> Scott Jeffries, *Baby Doge Coin (BabyDoge): What It Is, What It's Worth and Whether You Should Invest*, NASDAQ (Sept. 15, 2022), <https://www.nasdaq.com/articles/baby-doge-coin-babydoge:-what-it-is-what-its-worth-and-whether-you-should-invest> (last visited Mar. 22, 2023).

network that allows for fast and low-cost transactions.<sup>83</sup> Therefore, staking BabyDoge tokens can be used to earn rewards as well as secure the entire network because this coin employs Proof-of-Stake (PoS) consensus mechanism.

One of the most intriguing things about BabyDoge is its auto liquidity generation mechanism. In this protocol, a certain percentage of each transaction is automatically put into the liquidity pool, thus balancing the coin's price and preventing severe fluctuations.<sup>84</sup> Another thing that distinguishes BabyDoge from other digital currencies is its charitable giving stance. This has been seen that the team behind this cryptocurrency is committed of donating some proportion of its total supply to animal welfare groups. Consequently, it has become famous among people who love animals as well as those with generous hearts. BabyDoge's market cap has increased significantly even though it's a relatively new crypto coin. In just two months after being launched, this coin reached a capitalization of \$1 billion and continues going up.

Active community is one of the factors that make BabyDoge popular among people. Fans have flocked in their numbers on different social media platforms like Reddit and Twitter, where they share memes and hold conversations in relation to it. In addition, BabyDoge success can be attributed to its listing on prominent cryptocurrency exchanges such as Binance, BitMart or KuCoin which makes easy for investors to buy or sell it. In a nutshell, baby doge coin is a relatively new cryptocurrency that has become popular because of its distinct brand, charity donations and active community. Whether or not, it can keep its growth in the long run is still uncertain, but what it has achieved up to this point indicates that what good marketing and building of communities can do within the cryptocurrency industry.

---

<sup>83</sup> Baby Doge Coin Price | BabyDoge Price Index, Live Chart and INR Converter - Binance, Binance - Cryptocurrency Exchange for Bitcoin, Ethereum & Altcoins, <https://www.binance.com/en-IN/price/baby-doge-coin> (last visited Mar. 26, 2023).

<sup>84</sup> *Introduction of Digital Assets / Huobi*, HUOBI, <https://www.huobi.com/en-in/asset-introduction> (last visited Mar. 22, 2023).

### 1.7.4 Floki Inu (FLOKI)

A new meme token in the crypto space gaining significant popularity recently is Floki. It borrows from a character named Floki in Vikings as its name, "Floki".<sup>85</sup> The price of the coin had risen sharply to a new all-time high just days after its launching in early October 2021. This case study looks into background of the floki token.<sup>86</sup> Floki is a fresh token primarily on the Binance Smart Chain (BSC) that seeks to benefit from the current boom in meme coins in crypto circles.<sup>87</sup> Elon Musk's dog, Floki as well as Floki from Vikings' television series serve as an inspiration for this particular token. The project team aims to create an influential community around it which will ensure sustained value for long-term users.

The token had a transaction fee of 10% for every transaction made with it, and 5% goes to token holders while the other 5% is added to liquidity pool.<sup>88</sup> In addition, Floki has an NFT market place which allows users to buy and sell NFTs using the Floki token. The Binance Smart Chain powers this marketplace that is integrated into the Floki website. This integration speeds up transactions and enables cheap deals for people who want to buy or sell NFTs using Floki. In a matter of days, the price of Floki soared considerably after it was launched. This token has received incredible support from its community with many followers on platforms like Telegram and

---

<sup>85</sup> Jeff Benson, Chinese Exile With Ties to Steve Bannon to Pay SEC \$539M Over G-Coins ICO - Decrypt, Decrypt (Sept. 13, 2021), <https://decrypt.co/80839/chinese-exile-ties-steve-bannon-pay-sec-539-g-coins-ico/> (last visited Mar. 26, 2023).

<sup>86</sup> *Floki Inu Price To Pump With CRO Listing, While This New Meme Coins Presale EXPLODES*, [HTTPS://WWW.OUTLOOKINDIA.COM/](https://www.outlookindia.com/) (Mar. 24, 2023), <https://www.outlookindia.com/outlook-spotlight/floki-inu-price-to-pump-with-cro-listing-while-this-new-meme-coins-presale-explodes-news-272627> (last visited Mar. 20, 2023).

<sup>87</sup> *Get to Know Floki in This Overview Video About â The Peopleâ s Currencyâ*, BSC NEWS | THE LATEST NEWS ON CRYPTO, NFTS, AND DeFi (Jan. 13, 2023), <https://www.bsc.news/post/get-to-know-floki-in-this-overview-video-about-the-peoples-currency> (last visited Mar. 22, 2023).

<sup>88</sup> *Grab Your Piece of the Pie: Sector Finance Token is Set For Launch*, BSC NEWS | THE LATEST NEWS ON CRYPTO, NFTS, AND DeFi (Mar. 21, 2023), <https://www.bsc.news/post/grab-your-piece-of-the-pie-sector-finance-token-is-set-for-launch> (last visited Mar. 26, 2023).

Twitter.<sup>89</sup> This community is responsible for propelling this token's success, therefore, as the word spreads to other people's ears, there would be a growth in this token also.

Floki is a newly launched meme coin that seems promising in the crypto space. It differentiates itself from others through its vibrant community and an NFT marketplace. However, using Binance Smart Chain may come with some risks, though the developers have demonstrated their willingness to experiment with other blockchain networks. All in all, Floki appears like a thrilling undertaking whose triumph can lead to more meme coins emerging later on.

### 1.7.5 Dogelon Mars (ELON)

Dogelon Mars (ELON), which has a lot of investors interested in it and traders buying it up, is still relatively new cryptocurrency. Launched in April 2021, Elon is a memecoin dedicated to Elon Musk who happens to be Tesla's CEO as well as SpaceX's CEO too. The idea behind this crypto is to merge space exploration and blockchain technology together.<sup>90</sup> The Dogelon Mars is a decentralized peer-to-peer blockchain network running on the Ethereum blockchain. It is a deflationary cryptocurrency because of its burning mechanism that causes it to decrease in total supply over time. The maximum supply of ELON tokens is set at 1 quadrillion with over 100 trillion tokens already burnt.<sup>91</sup> In this cryptocurrency, 4% of every transaction automatically goes to liquidity pool, 4% goes to existing holders while the other 2% gets burned forever. This ensures that the price of ELON remains stable and that the value of existing tokens increases over time.

---

<sup>89</sup> *TheNewsCrypto on Binance Feed: Top Trending Cryptocurrencies of the Week / Binance Feed*, BINANCE FEED (Mar. 3, 2023), <https://www.binance.com/en-IN/feed/post/268137> (last visited Mar. 22, 2023).

<sup>90</sup> *What Is Dogelon Mars? A DOGE-ELON Coin Hybrid / Gemini*, GEMINI (Feb. 24, 2022), <https://www.gemini.com/cryptopedia/what-is-dogelon-mars-crypto-meme-coin-elon-token> (last visited Mar. 21, 2023).

<sup>91</sup> Nicole Willing, *Dogelon Mars Price Prediction / Is Dogelon Mars a Good Investment?*, ONLINE TRADING WITH SMART INVESTMENT APP | CAPITAL.COM (Dec. 12, 2022), <https://capital.com/dogelon-mars-elon-price-prediction> (last visited Mar. 20, 2023).

The Dogelon Mars community is a large and vibrant one with deep interest in space exploration and technology. The community is very much involved in marketing the cryptocurrency through social media platforms like Reddit and Twitter. Even, they have built a spaceship, Dogeship-1 that aims at landing a Dogelon flag on the moon.<sup>92</sup> The projections of Dogelon Mars' marketing strategy are mainly revolving around Elon Musk and his interests. This digital currency uses "To Mars with Elon," as their marketing slogan to show how they can merge blockchain technology with space missions. Consequently, this has contributed to the growth of Dogelon Mars as it is known for regularly tweeting about the figurehead Elon Musk and his companies which helped gain traction amongst wider crypto communities.

Dogelon Mars is a risky and highly volatile memecoin. Nevertheless, it has experienced significant growth in its value since its inception. At present, the price of ELON is approximately \$0.00000002 compared to its initial price of \$0.00000001 when it was launched. With a market cap surpassing one billion dollars, it used to fall into the top 100 cryptocurrencies by market capitalization category.<sup>93</sup> Some investors consider Dogelon Mars as an opportunity for long-term investment given that the deflationary tokenomics system and strong community are backing up the platform. However, like all other memecoins including Dogelon Mars, they are highly speculative, hence very risky investments too. Dogelon Mars is a memecoin that combines technology motivation into one related to space exploration. Although a relatively young cryptocurrency, it has already attracted numerous enthusiasts. Nonetheless, one must be aware that such memecoins as Dogelon Mars are highly volatile and extremely risky thus investors should conduct own research before committing money into them.

---

<sup>92</sup> *Social Network for Programmers and Developers*, MORIOH, <https://morioh.com/p/4e168c7d9459> (last visited Mar. 21, 2023).

<sup>93</sup> Disha Sinha, *Dogelon (ELON) is after SHIB and DOGE! Can It be the Next Big Meme Coin?*, ANALYTICS INSIGHT (Aug. 2, 2022), <https://www.analyticsinsight.net/dogelon-elon-is-after-shib-and-doge-can-it-be-the-next-big-meme-coin/> (last visited Mar. 21, 2023).

## 1.8 DEX Related Crypto:94

The Decentralised Exchange or DEX is a cryptocurrency exchange whereby there are no middlemen and central authorities involved. The transactions that occur here are between users only and they are secured through the blockchain network. DEX-related cryptocurrencies refer to tokens or coins that are used by these decentralised exchanges to facilitate transactions. Typical examples of some famous DEX-related cryptocurrencies include Uniswap (UNI), PancakeSwap (CAKE), and SushiSwap (SUSHI). These tokens provide liquidity on the exchanges and are rewarded to users who stake, provide liquidity, or interact with governance. Here are some of the case studies of popular crypto projects belonging to the segment of DEX-related cryptocurrencies:

### 1.8.1 Cake Token (Pancake Swap)<sup>95</sup>

Decentralized exchanges (DEXs) have come up as a notable alternative to centralized exchanges where users can trade cryptocurrencies in a decentralized and trust-less manner. PancakeSwap is one such DEX that has attracted a lot of attention over the past few years. It is primarily based on Binance Smart Chain (BSC) and is supported by the CAKE token cryptocurrency. The case study will analyze more about Pancake Swap's CAKE token including its characteristics, performance, future prospects.

### Overview of PancakeSwap and CAKE Token

PancakeSwap is a decentralized exchange that launched on September 2020 on Binance Smart Chain. It offers multiple features

---

<sup>94</sup> *The Ins and Outs of Decentralized Exchanges (DEXs) / Hedera, HEDERA*, <https://hedera.com/learning/decentralized-finance/decentralized-exchanges> (last visited Mar. 19, 2023).

<sup>95</sup> *The evolution of cryptocurrencies in India and what the future looks like*, TIMES OF INDIA BLOG (May 5, 2022), <https://timesofindia.indiatimes.com/blogs/voices/the-evolution-of-cryptocurrencies-in-india-and-what-the-future-looks-like/> (last visited Mar. 19, 2023).

like trading, liquidity provision, yield farming among others. One unique thing about PancakeSwap is its use of Cake token as its native token. The CAKE token has many features, such as but not limited to:

**Governance:** The Cake token is employed for governance in PancakeSwap which enables token holders to vote on diverse proposals and platform changes.

**Liquidity Provision:** An automated market maker (AMM) model is used by PancakeSwap, which means that liquidity providers (LPs) have to provide liquidity to facilitate trading. LPs are motivated to provide liquidity through fees and rewards paid in form of Cake tokens.

**Rewards:** The Cake token acts as a reward for users who participate in various PancakeSwap activities such as yield farming, staking and providing liquidity.

The price and market capitalization of Cake token have grown since its launch in September 2020.<sup>96</sup> Initially, the candle traded at around \$0.10 in September 2020 but this has since increased to over \$25 while writing this chapter. This is a significant return on investment for initial investors and early adopters. The increase in popularity of PancakeSwap as a decentralized exchange is one of the factors that has contributed to the growth of the Cake token. For instance, PancakeSwap has experienced exponential growth in trading volume, liquidity and number of users over the past few months making it one of the leading DEXs within the crypto industry. This expansion is due to many reasons including lower fees, faster transaction rates as well as additional features such as API integration plugins etc.

The platform continues to grow and add new features, therefore the future of Cake token and PancakeSwap seems to be positive. Additionally, PancakeSwap has also launched a non-fungible token (NFT) marketplace where users can transact NFTs using the Cake

---

<sup>96</sup> PancakeSwap Price Prediction | Is PancakeSwap a Good Investment?, Online Trading with Smart Investment App | Capital.com, <https://capital.com/pancakeswap-cake-coin-price-prediction> (last visited Mar. 16, 2023).

token.<sup>97</sup> This has drove up the demand for the token as well as position of the PancakeSwap as one of the leading DeFi or NFT platforms.

PancakeSwap's CAKE tokens are significant decentralized exchange ecosystem tokens that act as a native token for one of the major DEXs in crypto industry. It has been successful due to its characteristics like governance, liquidity provisioning as well as rewards which helped it to grow its value.

### 1.8.2 UNI Token (Uniswap)

Uniswap is a decentralized exchange (DEX) that facilitates peer-to-peer cryptocurrency trading. It was launched in November 2018 and has since emerged as one of the most popular DEXs in the crypto market. Uniswap has its own native token, called UNI token, which is employed for governance and incentivizing liquidity providers.<sup>98</sup> In this case study, we shall delve into the UNI token of Uniswap more including characteristics, performance and future prospects.

### Overview of Uniswap and UNI Token

Uniswap is a decentralized exchange which runs on Ethereum blockchain. Trading cryptocurrencies can be done without an order book due to automated market maker (AMM) model it employs. Instead, a mathematical algorithm takes care of balancing supply and demand for each cryptocurrency resulting into its price. Launched through a governance proposal in September 2020, UNI is an ERC-20 token that serves as a means of governing and rewarding liquidity

---

<sup>97</sup> Rahul Nambiampurath, *PancakeSwap to Launch NFT Marketplace and PancakeSquad Collection on Sept 22*, YAHOO FINANCE (Sept. 9, 2021), <https://finance.yahoo.com/news/pancakeswap-launch-nft-marketplace-pancakesquad-102106204.html> (last visited Mar. 20, 2023).

<sup>98</sup> Contributors to Wikimedia projects, *Uniswap - Wikipedia*, WIKIPEDIA, THE FREE ENCYCLOPEDIA (Nov. 28, 2020), <https://en.wikipedia.org/wiki/Uniswap> (last visited Mar. 20, 2023).

providers within the Uniswap ecosystem.<sup>99</sup> The UNI token has several features, including:

**Governance:** It is an instrument of voting on the Uniswap platform, where token holders can vote on proposals or any changes that take place.

**Incentives:** Uniswap encourages liquidity providers to supply liquidity to the protocol by means of fees and rewards in the form of UNI tokens. This ensures the presence of a deep market for trading here.

**Community:** A well-established community made up of believers and users who use UNI token has contributed significantly towards Uniswap's success.

As at September 2020, UNI token had experienced substantial appreciation in price and market capitalization. It was initially worth approximately \$1.00 per unit at this period but has since gone over \$30 as at now while writing this chapter. The first investors and adopters were able to make significant gains from their investments.<sup>100</sup> With Uniswap attracting more traders every day as it becomes more decentralized, UNI token has grown faster than ever before. In recent times, there has been a surge in trading volume on Uniswap, thus, increasing its liquidity and user base making it one of the leading DEXs worldwide. Some factors have played a role in fostering these developments like reduced charges when transacting, shorter waiting times for payments and wide variety among others.

The future for the UNI token and Uniswap is bright as their platform continues to expand and add more functionalities. Some of the key developments expected to spur this growth in coming months include launch of Uniswap advanced versions which will introduce new features like concentrated liquidity, multiple fee tiers, integration with new blockchain networks such as Arbitrum and Optimism

---

<sup>99</sup> *Introducing UNI*, UNISWAP PROTOCOL, <https://uniswap.org/blog/uni> (last visited Mar. 21, 2023).

<sup>100</sup> Paddy Baker, *Uniswap's Newly Launched UNIToken Has Already Doubled in Price*, COINDESK: BITCOIN, ETHEREUM, CRYPTO NEWS AND PRICE DATA (Sept. 18, 2020), <https://www.coindesk.com/markets/2020/09/18/uniswaps-newly-launched-uni-token-has-already-doubled-in-price/> (last visited Mar. 20, 2023).

among others.<sup>101</sup> Additionally, Uniswap has also laid down plans to start a decentralized finance (DeFi) education and advocacy initiative aimed at creating awareness about DeFi advantages and the benefits of using Uniswap platform. This is poised to drive up demand for the UNI token while establishing Uniswap as a leading decentralized finance platform. Uniswap's UNI token is an important asset in the decentralized exchange space that serves as its DEX being one of the largest DEXs in crypto industry by market cap. The governance and incentivization of liquidity providers are some of its characteristics that have facilitated its success and increased its value over time.

### 1.8.3 SUSHI Token (Sushiswap)

In the year 2020, SushiSwap became a decentralized exchange (DEX) which was created as a fork of Uniswap. It has its own specific token called SUSHI. It serves the purposes for incentivizing liquidity providers and governance. This study aims at offering an in-depth explanation of the features, performance and prospects of SUSHI token by means of examining it.<sup>102</sup>

### Overview of SushiSwap and SUSHI Token

SushiSwap is a decentralized exchange that operates on top of Ethereum blockchain. For instance, there is no order book that is required by this type of exchange protocol when users are trading. With additional features and improvements such as yield farming program and governance model, SushiSwap was created from Uniswap in 2020. The launch date for SUSHI tokens happened as part of the wider project's release in August 2020 while being referred to as an ERC-20 Token under the umbrella term "SushiSwap". Such native coin named SUSHI achieves on its way to encouraging all liquidity suppliers who operate within platform fees together with

---

<sup>101</sup> Daniel Phillips Ki Chong Tran, *What is Uniswap? A short guide to the token swap exchange - Decrypt*, DECRYPT (June 17, 2021), <https://decrypt.co/resources/what-is-uniswap/> (last visited Mar. 16, 2023).

<sup>102</sup> Poloniex, *What is Sushiswap?*, MEDIUM (Mar. 17, 2023), [https://medium.com/poloniex/what-is-sushiswap-890dbb848993?source=user\\_profile-----5-----](https://medium.com/poloniex/what-is-sushiswap-890dbb848993?source=user_profile-----5-----) (last visited Mar. 14, 2023).

rewards via SUSHI tokens to make certain that trading pool remains liquid.<sup>103</sup> The SUSHI token has several features, including:

**Governance:** The governing body responsible for running different aspects within SushiSwap is regulated using only one single type of cryptocurrency known as ‘SUSHI’.

**Incentives:** Liquidity suppliers on the platform get rewarded through fee incentives and sushis tokens to encourage them to keep supplying liquidity on the platform in order to enable smooth trading activities.

**Yield farming:** Sushiswap has a program for those farmers seeking yields, and it allows them to obtain rewards in the form of SUSHI tokens by staking their tokens on the platform.

Since its debut in August 2020, the SUSHI token has shown significant price growth and market capitalization. The token was initially priced at approximately \$1.00 in August 2020 but rose to over \$15 as at the time of writing this chapter. This is a significant return on investment for early adopters and investors.<sup>104</sup> Popularity of decentralized exchange called SushiSwap is one of such factors that have contributed to what has been seen as an explosive growth in value of SUSHI token. In recent months, Sushiswap has witnessed tremendous increase in trading volume, liquidity and users making it one of the leading DEXs within crypto industry now. Several factors led to this growth including its farming facility which seems attractive to many individuals interested in cryptocurrencies high returns on investments.

The future of SUSHI token and SushiSwap seems to be bright as the platform expands while adding more functions. Key developments expected to drive growth in the next few months include launching of SushiSwap’s advanced version, that will bring features like limit orders and a more user-friendly interface among others; and adoption of new blockchain networks such as Binance

---

<sup>103</sup> *SushiSwap Review: Still Worth It? Everything We Found Out!!*, COIN BUREAU, <https://www.coinbureau.com/review/sushiswap-sushi/> (last visited Mar. 26, 2023).

<sup>104</sup> Liam J. Kelly, *Sushi, Lido Finance Drop 10% as Top DeFi Tokens Plunge* - Decrypt, Decrypt (Oct. 13, 2022), <https://decrypt.co/111844/sushi-lido-finance-drop-top-defi-tokens-plunge/> (last visited Mar. 26, 2023).

Smart Chain and Polygon. Additionally, SushiSwap has announced plans for launching a decentralized autonomous organization (DAO) which will decentralize decision-making on the platform transcending power from the present top-down approach towards community oriented governance. This move is projected to boost demand for SUSHI tokens thereby establishing SushiSwap as one of the leading decentralized finance platforms.<sup>105</sup> This is an essential digital currency in non-custodial exchange world currently acting as the native token for one of the leading crypto industries DEXs. Such features have made it successful and valuable including governance, liquidity incentives, yield farming program etc.

#### 1.8.4 Shibaswap

ShibaSwap is a decentralized exchange (DEX) created by Shiba Inu's developers, who are responsible for this popular meme inspired cryptocurrency. ShibaSwap works on Ethereum blockchain and was built to provide a place where traders can trade Shiba Inu or other crypto currencies in a non-centralized way that is also safe. For this case study, we will look at the above-mentioned items in detail.<sup>106</sup>

#### Overview of ShibaSwap

ShibaSwap operates on the Ethereum blockchain using an Automated Market Maker (AMM) model. This model allows users to trade cryptocurrencies without needing an order book. The platform also has liquidity pools within which stakers stake their assets while providing liquidity to the platform. They earn a fraction of the trading fees generated by the platform as well. Additionally, there is a yield farming program that rewards users with SHIB tokens

---

<sup>105</sup> *SushiSwap Plans Reveal Top-Heavy Side of DeFi Governance*, PAYMENTS NEWS & MOBILE PAYMENTS TRENDS, CONSUMER PAYMENTS NEWS, FINANCIAL TECHNOLOGY NEWS | PYMNTS.COM (Oct. 5, 2022), <https://www.pymnts.com/cryptocurrency/2022/sushiswap-plans-reveal-top-heavy-side-of-defi-governance/> (last visited Mar. 21, 2023).

<sup>106</sup> *What is ShibaSwap and How Does It Work?*, CRYPTO NEWS: LATEST CRYPTOCURRENCY NEWS, BITCOIN NEWS, ETHEREUM NEWS AND PRICE DATA, <https://cryptonews.com/exclusives/what-is-shibaswap.htm> (last visited Mar. 20, 2023).

for staking their assets on the platform and lastly, it has got a governance system that gives voting rights to its users on any proposals made for changes on board. ShibaSwap offers several features, including:<sup>107</sup>

**Liquidity pools:** Users get remunerated with part of trading fees from the above by simply putting their property into these platforms.

**Yield farming:** On their website they stated: “SHIBA INU will be rewarded to you”.

**Governance:** The platform has a governance system that enables users to vote on proposals and changes to the platform.

Since its launch in July 2021, ShibaSwap has experienced significant growth. Within a few days of its launch, the platform had attracted over \$1 billion in total value locked (TVL). However, shortly after its launch, the platform suffered a security incident that resulted in the loss of some user funds. Despite this setback, ShibaSwap has continued to attract users and liquidity.<sup>108</sup> The price of SHIB, the native token of ShibaSwap, has also experienced significant volatility since its launch. The token initially traded at a low value, but it saw a significant increase in value in early May 2021. However, the token has since experienced significant price swings and volatility, which makes it a risky investment for some users. ShibaSwap faces several challenges and competition from other decentralized exchanges, such as Uniswap and PancakeSwap. One of the most significant challenges is the platform's security, as it has already experienced a security incident shortly after its launch. To compete with other decentralized exchanges, ShibaSwap needs to continue adding new features and incentives to attract users and liquidity. The decentralized exchange, ShibaSwap, was founded which offers a range of services such as liquidity pools, yield farming and governance. Since its launch, the platform has experienced

---

<sup>107</sup> Bybit Learn, *What Is ShibaSwap? — and How to Use It*, BYBIT LEARN (Dec. 28, 2022), <https://learn.bybit.com/defi/what-is-shibaswap/> (last visited Mar. 25, 2023).

<sup>108</sup> Jordan Finneseth, *Shiba Inu (SHIB) DEX ShibaSwap surpasses \$1B TVL 24-hours after launch*, COINTELEGRAPH (July 7, 2021), <https://cointelegraph.com/news/shibu-inu-shib-dex-shibaswap-surpasses-1b-tvl-24-hours-after-launch> (last visited Mar. 18, 2023).

significant growth, however, it is faced with various challenges including; competition from other decentralized exchanges and security issues. In order to ensure long-term success, ShibaSwap must continue innovating and getting better in order to attract users and become one of the leading players in the DeFi space.

### 1.8.5 QUICK Token (Quickswap)

QuickSwap<sup>109</sup> is a DEX on Polygon network which is an Ethereum layer 2 scaling solution commonly known as Optimistic rollups. It began operating in February 2021 as an AMM platform that enables users to perform transactions at high speed and low cost. This study investigates Quick's native token QUICK which looks into its functionality, performance, prospects.

#### Overview of QuickSwap

It acts as a DEX on Polygon network which is Ethereum's Layer 2 scaling solution built on Optimistic rollups. The platform employs the Automated market-making (AMM) model allowing traders to buy cryptocurrencies without having any need for order books. Besides this, QuickSwap also offers liquidity pools where individuals can provide liquidity for the platform and in return earn part of trading fees.<sup>110</sup> The native token of QuickSwap known as Quick (QUICK), includes several functions such as<sup>111</sup>:

**Liquidity provision:** Liquidity providers can reward themselves with QUICK Tokens, since they can contribute liquidity to QuickSwap's liquidity takers.

**Trading fee discounts:** People who own QUICK at the moment can benefit from reduced exchange charges on QuickSwap.

---

<sup>109</sup> *QuickSwap*, QUICKSWAP, <https://quickswap.exchange/> (last visited Mar. 21, 2023).

<sup>110</sup> *Binance Academy on Binance Feed: What Is QuickSwap and How Does It Work?* / *Binance Feed*, BINANCE FEED, <https://www.binance.com/en-KZ/feed/post/43000> (last visited Mar. 22, 2023).

<sup>111</sup> Bybit Learn, *What Is QuickSwap – And How Does It Work?*, BYBIT LEARN (Sept. 5, 2022), <https://learn.bybit.com/defi/what-is-quickswap-crypto/> (last visited Mar. 22, 2023).

**Governance:** QuickSwap platform modification proposals and updates are expected to be voted on by holders of QUICK Token.

Quickswap has had significant growth since its release in February 2021. It has witnessed a steady increase in trading volumes as well as attracting more users and associated liquidity. After being launched at a rate of around \$1 per token, it is now trading at a much higher price.<sup>112</sup> This can be attributed to low transaction fees as well as quick transaction times which have boosted the success of QuickSwap. Compared to other DEXs that rely on Ethereum networks, such fast transfer times and low gas fees are possible because it operates on Polygon network.<sup>113</sup> Competitors would include all other decentralized exchanges using ethereum network while there could make some difference for this one due to the low costs charged for trades and time taken in transactions. Additionally, by having governance characteristics conferred upon them through QUICK Tokens among others could influence even more passionate users towards DeFi business models such as QuickSwap. A Polygon-based decentralized exchange (DEX) is QuickSwap, and it promises fast and cheap transactions to its customers. Its own currency called QUICK is endowed with many things such as providing liquidity, reducing payment charges and managing the behaviour of QuickSwap's users. QuickSwap has grown a lot since its inception and this means it may be around for long in the DeFi Market. Nonetheless, QuickSwap will need to continue to be a major player in the DeFi space. However, in order to maintain the lead among competitors, QuickSwap should remain innovative.

---

<sup>112</sup> *Overview of Challenges of NFT Marketplaces and Introduction to Elixer*, INTERNATIONAL JOURNAL & RESEARCH PAPER PUBLISHER | IJRASET, <https://www.ijraset.com/research-paper/overview-of-challenges-of-nft-marketplaces-and-introduction-to-elixer> (last visited Mar. 16, 2023).

<sup>113</sup> *Solana Vs. Polygon Vs. Ethereum – The Ultimate Comparison - Blockchain Council*, WEB3 & BLOCKCHAIN CERTIFICATIONS | ONLINE TRAINING & COURSES | BLOCKCHAIN COUNCIL, <https://www.blockchain-council.org/blockchain/solana-vs-polygon-vs-ethereum/> (last visited Mar. 21, 2023).

## 1.9 AI Coins:

AI-based cryptocurrencies are a new breed of cryptocurrencies designed to use AI and machine learning in enhancing efficiency as well as accuracy in financial transactions. Artificial intelligence coins or tokens are AI based cryptocurrencies that optimise transaction processing using AI, machine learning to predict market trends among others for enhancing cryptocurrency system functionality. Fetch.ai (FET), Singularity NET (AGIX), Numerai (NMR) are some of the examples of AI-based cryptocurrencies aimed at improving their utility through integrated AI and Machine Learning algorithms. Some of key case studies include the following:

### 1.9.1 SingularityNET (AGIX)

The decentralized platform Singularity NET (AGIX)<sup>114</sup> was launched in 2017 to democratize the Artificial Intelligence (AI) industry. The AI developers and consumers are brought together on a decentralized, transparent and democratic ecosystem. Monetizing their algorithms is possible for developers through Singularity NET while services are availed to consumers via smart contracts. On top of that, AGIX tokens are used by customers to pay for developer's services and take part in the governance of the platform. SingularityNET has made it possible for its community to make decisions concerning the future direction of this platform through its decentralised democratic governance system. Moreover, transparency is fostered by ensuring that decision making processes as well as governance structures are open to public scrutiny.

Furthermore, partnerships between SingularityNET and established companies or organizations within AI space have been formed, they includes Huawei, Ocean Protocol, and Robotics Education & Competition Foundation. These collaborations have played a huge role towards making SingularityNET visible and credible in AI industry.<sup>115</sup> Singularity NET has developed various

---

<sup>114</sup> SINGULARITYNET, <https://singularitynet.io/> (last visited on March 15, 2023).

<sup>115</sup> CRYPTONEWSZ, <https://www.cryptonews.com/cardano-surpasses-100-ema-ada-bullishness-is-inevitable/> (last visited on March 15, 2023).

applications that can demonstrate the capabilities of its platform including Sophia's AI,<sup>116</sup> which makes it possible for Sophia to interact with people in a more advanced and natural way, as well as OpenCog - an AI platform focused on such areas as NLP and computer vision. However, there are other blockchain-based AI platforms like DeepBrain Chain and Neuromation which present competition to SingularityNET with similar offerings also targeting the AI market space. In summary, SingularityNET is decentralized system aimed at democratizing the AI industry by creating an open and transparent ecosystem where developers and users come together. The visibility and believability of this platform were increased by decentralized governance structures and partnerships with established firms both private corporation and non-governmental organizations. However, it will need to continue being innovative and differentiating from competitors if it has to remain competitive in the market.

### 1.9.2 Fetch.ai (FET)

Fetch.ai (FET) is a decentralized platform launched in 2017 that aims to leverage Artificial Intelligence (AI) and blockchain technology to create a more efficient and intelligent internet.<sup>117</sup> The platform allows individuals, organizations, and machines to transact with each other directly without the need for intermediaries.<sup>118</sup> Fetch.ai's autonomous agents perform a variety of tasks such as buying and selling goods and services, managing supply chains, and optimizing energy usage. Nodes on the network are rewarded with FET tokens for providing computation power and data, and the platform incorporates a unique approach to consensus called 'proof-of-stake' with reputation. The Fetch.ai platform is built on decentralization security having nodes that communicate with each other forming networks that reward good conduct and trustworthiness. To illustrate the versatility of its applications as well

---

<sup>116</sup> COINBASE, <https://www.coinbase.com/price/singularitynet> (last visited on March 13, 2023).

<sup>117</sup> CRYPTOLINKS, <https://cryptolinks.com/1503/fetch> (last visited on March 15, 2023).

<sup>118</sup> KAIRONLABS, <https://blog.kaironlabs.com/how-to-launch-your-token-choose-the-right-blockchain-platform/> (last visited on March 13, 2023).

increase the credibility of the platform, collaborations have been forged with players within varied sectors such as energy, healthcare, finance among others.

Nonetheless, Fetch.ai has competition from other decentralized platforms that aim to utilize AI and blockchain technology and create a more efficient and clever internet. SingularityNET and Ocean Protocol are among such platforms. These platforms also have different target industries and use cases. In general terms, Fetch.ai is a decentralized platform that uses AI and blockchain technology to create an effective and brilliant internet. In addition, it owns autonomous agents which enable direct transactions by individuals, organizations or machines without any intermediary involvement while its unique consensus method encourages trustworthy behaviour. While the company has partnered with established companies across various industries, there are other similar platforms that compete against it in terms of its decentralization objectives.

### 1.9.3 Ocean Protocol (OCEAN)

Ocean Protocol is a decentralized data exchange protocol that was launched in 2019.<sup>119</sup> The goal of this platform is to create a marketplace for data assets using blockchain technology to facilitate safe buying, selling and sharing of data assets by individuals and organizations. In the same vein, the protocol enables data providers to commercialize their data assets through self-pricing terms and maintaining ownership as well as control of their data. On the other hand, for different use cases, there are several data assets which various consumers may utilize. Ocean Protocol has one feature that makes it unique and that is its flexible modular architecture that enables it to support many different types of data assets and use cases. It also has “data tokens” that represent the ownership and control of data assets. Additionally, its “compute-to-data,” feature allows computation on a given asset without downloading it first.

Furthermore, some partnerships have been established with Daimler AG, a German-based multinational automotive corporation

---

<sup>119</sup> GLOMICA, <https://www.glomica.com/top-10-best-web3-crypto-coins-set-to-explode-by-2025-market-volatility-230217104318> (last visited on March 13, 2023).

and the Info-communications Media Development Authority (IMDA) Singapore. These alliances have been established to explore diverse applications on this platform. Ocean Protocol on the other hand, has to contend with other data exchange platforms such as Streamr and Datum, in addition to long established centralized data markets like Google and Amazon. To summarize, Ocean Protocol is a decentralized data exchange protocol that aims at creating a marketplace for data assets. The platform allows for monetization of data assets by the providers while still retaining control and ownership over their respective data, users can also access different types of data assets depending on their requirements. Nevertheless, Ocean Protocol has distinctive features compared to its competitors due to modular architecture but competition from both decentralized and centralized marketplaces for data cannot be ignored.

#### 1.9.4 Numeraire (NMR)

Numeraire (NMR)<sup>120</sup> is an AI-powered hedge fund using blockchain technology to predict financial model performance. Since it was unveiled in 2017, this platform has become one of its kind in the financial sector attracting investors from across the globe. Numeraire's AI system employs machine learning algorithms to scrutinize financial data and yield predictive models. These models are then used in making trading decisions as well as optimizing portfolios. The technology of blockchain is applied for secure storage and tracking the performance of these models that are developed through weekly competitions by a global community of contributors. The platform also has exceptional incentive structure whereby data scientists participating in the weekly competitions earn NMR tokens for developing better performing predictive models. The more accurate the model, the higher the reward. This encourages data scientists to continually develop their own models and contribute to collective knowledge on this platform.

---

<sup>120</sup> INVESTOPEDIA,

<https://www.investopedia.com/terms/n/numeraire.asp#:~:text=Key%20Takeaways-,Numeraire%20is%20an%20economic%20term%20of%20French%20origin%2C%20which%20acts,numeraire%20for%20most%20commodity%20prices> (last visited on March 15, 2023).

The native currency used in staking on predictive models performance within this platform is NMR.<sup>121</sup> Investors have an opportunity to buy NMR on various digital currency exchanges and utilize them for investing into predictive models created by the platform. When these models are executed successfully, investors would earn rewards in form of NMR tokens. Numeriare has been able to secure investments from some reputable companies such as Placeholder Ventures and Union Square Ventures. Furthermore, the platform is in partnership with a number of industry leaders in the likes of Microsoft who are interested in AI and blockchain in finance. In conclusion, Numeriare is a decentralized hedge fund that utilizes AI and blockchain technologies in predicting financial model performances. Financial data for Numeriare's AI system provides predictive models for investment decisions and optimization of investment portfolios. NMR tokens are given to those data scientists participating in weekly tournaments whose development of high-performance ones contributes to better predictions while clients can use NMR in investing on predictive models, thus earning rewards from it. Notable firms have invested in Numeriare.

### 1.9.5 IExec RLC (RLC)

IExec RLC (RLC) is a decentralized cloud computing platform that enables developers to build and deploy decentralized applications (dApps) that require intensive computing power. Computing resources on the platform are both secure and scalable but at the same time allow developers to monetize their applications and services. The IExec operates on Ethereum blockchain which provides a safe and open environment for DApps.<sup>122</sup> The native cryptocurrency used for

---

<sup>121</sup> Nancy Lubale, *Numeriare Price Prediction: NMR Rallies Over 100% To \$20 – Time To Buy?*, INSIDE BITCOINS (March 15, 2023), <https://insidebitcoins.com/news/numeraire-price-prediction-nmr-rallies-over-100-to-20-time-to-buy>.

<sup>122</sup> MIRROR.XYZ, [https://mirror.xyz/0x10364bc63464bD9Cd6492e9a1C6DE7BF91e60D38/B-4zn9gFnEA5clu\\_sxrLe2Pz2U\\_nI4V-LElcwWw9XKA](https://mirror.xyz/0x10364bc63464bD9Cd6492e9a1C6DE7BF91e60D38/B-4zn9gFnEA5clu_sxrLe2Pz2U_nI4V-LElcwWw9XKA) (last visited on March 13, 2023).

transactions within the platform is RLC.<sup>123</sup> To earn these tokens one can contribute computing resources or provide dApps and services to other users. One of the main characteristics of this decentralized marketplace is that it allows users to trade various resources including CPU, GPU, storage amongst others. This market place serves every person who has any form of computer resource, it is also made so flexible as well as scalable so as to meet different user requirements. At IExec platform, privacy and security measures are equally important. In order to guarantee the secure and isolated computations, the platform is using trusted execution environment (TEE) for data breach prevention and other security threats. Therefore, it is suitable for sensitive applications like health care, and finance among others.<sup>124</sup>

A growing ecosystem of developers, users and partners on IExec are working together on building and deploying innovative dApps. Some of these big players include IBM and EDF that have partnered with IExec to explore how to use decentralized cloud computing in several industries. To sum up, RLC is a decentralized cloud computing platform that gives developers safe scalable compute resources. The native cryptocurrency used for transactions on this platform is called RLC tokens whereas contributors of resources or developers of Dapps and services can acquire them as rewards. Consequently, this decentralized marketplace for computing resources, privacy/security measures as well as alliances with industry leaders make it a great potential for decentralizing cloud computing.

## 1.10 Privacy Coins or Tokens

Cryptocurrencies that favour the secrecy and privacy of the user are known as privacy coins or tokens. With such currencies, only a sender and recipient possess details on transactions because they

---

<sup>123</sup> ALIBABA CLOUD, <https://www.alibabacloud.com/topic-center/metaverse/1nc3co412j-what-is-the-coin-of-metaverse> (last visited on March 15, 2023).

<sup>124</sup> YAHOO FINANCE, <https://finance.yahoo.com/news/identos-achieves-international-standard-software-144000769.html?guccounter=1> (last visited on March 14, 2023).

employ sophisticated coding methods.<sup>125</sup> Privacy-oriented persons usually prefer to use privacy coins for their financial dealings. For instance, Monero (XMR), Zcash (ZEC) and Dash (DASH) are examples of such privacy coins. These coins include advanced privacy features like ring signatures, stealth addresses and private transactions making it difficult for others to trace any transaction involving them. Some case studies regarding this kind of cryptocurrency of secrecy are given below:

### 1.10.1 Monero (XMR)

Monero (XMR) is a digital currency that was introduced in April 2014 as a fork of Bytecoin with a strong emphasis on privacy. It is designed as an open-source blockchain network having a decentralization aspect targeting maximum anonymity and security of users. Monero is famous for its characteristics which promote anonymity thereby making it difficult for anyone to track money back to its owner. Monero employs ring signatures<sup>126</sup> to guarantee the privacy of its transactions. In other words, a person can sign a note on behalf of a group through ring signatures which makes it hard for outsiders to know who signed it. This is why Monero uses ring signatures to combine multiple transactions and hide them from being directly associated with any particular user. Moreover, Monero also introduces stealth addresses that help obscure transaction data more. Monero's privacy-oriented capabilities have made it more popular with privacy-concerned users. Still, Monero's use of privacy features has attracted malevolent persons acting as cybercriminals. Consequently, some major cryptocurrencies exchanges that are under regulatory scrutiny have excluded Monero from their listings. Nonetheless, Monero has persisted in improving and developing its technology. It was in October 2020, when Monero underwent an important network upgrade called "Oxygen Orion". The updates

---

<sup>125</sup> *Privacy on Cryptocurrencies: What You Need to Know*, CRYPTO.COM: THE BEST PLACE TO BUY BITCOIN, ETHEREUM, AND 250+ ALTCOINS, <https://crypto.com/university/privacy-cryptocurrencies> (last visited Mar. 21, 2023).

<sup>126</sup> Contributors to Wikimedia projects, *Ring signature - Wikipedia*, WIKIPEDIA, THE FREE ENCYCLOPEDIA (June 1, 2006), [https://en.wikipedia.org/wiki/Ring\\_signature](https://en.wikipedia.org/wiki/Ring_signature) (last visited Mar. 23, 2023).

included better signatures using rings as well as another proof-of-work algorithm among others. There were also reductions in transaction costs as well as enhancing the speed and efficiency of Monero transactions.

To begin with, one of the major issues facing Monero is acceptability. In fact, although a small group of users supports it, it has not been fully utilized for paying purposes. This is partly because privacy-based cryptocurrencies are poorly regulated and many vendors prefer more popular digital currencies such as Bitcoin or also Ethereum.<sup>127</sup> While encountering these problems, Monero has remained creative in terms of technological progression. It still remains one of the most favoured privacy oriented cryptos and its emphasis on security and privacy have set it apart from the rest.

### 1.10.2 ZCash (ZEC)

ZCash (ZEC) was created in October 2016 as a cryptocurrency aiming to enhance privacy and anonymity. The ZCash decentralized blockchain network provides transaction privacy through zero-knowledge proof technology within which parties can prove that a statement is true without revealing any information beyond the validity of the statement thus ensuring improved privacy by users. This means that ZCash appeals to people who consider their financial transactions very personal and confidential because they may involve sensitive money matters. However, some cybercriminals have adopted it for illegal activities hence prompting some exchanges to cease trading this currency. Despite all these obstacles, ZCash is available on many exchanges. Adoption is the major challenge for ZCash. There are a few dedicated users but ZCash cannot be used widely as a method of payment due to unresolved regulatory issues related to private-coins, and more popular coins such as Bitcoin and Ethereum among traders. The development of partnerships and expanding use cases within the ZCash team has been one way that they have been able to address these difficulties. In June 2020, it partnered with Binance, in order to offer its users more privacy

---

<sup>127</sup> Tom Wilson, *Explainer: 'Privacy coin' Monero offers near total anonymity*, U.S. (May 15, 2019), <https://www.reuters.com/article/us-cryptocurrencies-altcoins-explainer-idUSKCN1SL0F0> (last visited Mar. 22, 2023).

options while trading on the platform. Besides, they are considering applying the crypto currency beyond money transactions to secure messaging and data storage.

ZCash also has an unusual framework for governance that includes a “Founders’ Reward” system. This means that the founders of the project receive 20% of mined rewards in the first four years. People have criticized this governance structure for giving an unfair advantage to the founders who are ZCash inventors.<sup>128</sup> Regardless of these obstacles, ZCash still manages to be a ground breaker, continuing to develop its technology. In November 2020, it completed a significant network upgrade called Canopy that brought new features like reduced transaction fees and faster transaction times. Also, the reward was reduced from 20% to 10%, which was seen as a positive development by some members of ZCash community. Overall, ZCash is a well-established privacy-focused cryptocurrency despite challenges such as adoption and regulatory ambiguity. Its groundbreaking technological advancements and collaborations with key players within the crypto space imply that it could easily gain more widespread acceptance in future.

### 1.10.3 Ergo (ERG)

Ergo (ERG) is a proof-of-work blockchain platform aiming at providing better safety features, user-friendly interface, and flexibility compared to already existing blockchain networks. It performs all these functions since its inception in July 2019 when it was created with a concept of making it possible for both developers and people who do not understand technology easily access smart contracts and decentralized applications (DApps).<sup>129</sup> One of the key distinguishing features of Ergo is its Sigma protocol. This is a zero-knowledge proof system that is similar to that used in ZCash, and it allows Ergo to enhance privacy and security for users while maintaining scalability as well as speed. Another important thing to look at in Ergo is ErgoScript programming language. It also happens to be a Turing-

---

<sup>128</sup> *View: ICO Page*, CRYPTOCOIN.NEWS, <https://cryptocoin.news/view-ico-page/> (last visited Mar. 27, 2023).

<sup>129</sup> *Home | Ergo Platform*, HOME | ERGO PLATFORM, <https://ergoplatform.org/> (last visited Mar. 23, 2023).

complete language designed specifically for smart contracts development, hence more freedom and expressiveness than other smart contract languages. Ergo's governance structure ensures community-driven development. The project has 25% of block rewards allocated by a Treasury system to support the Ergo platform through a community-managed fund aimed at development and promotion. This way, the community participates in deciding which path should be taken by the project.

The Ergo Project is still yet to reach its first anniversary, but it has made some great progress. However, the development of the major net was done in November 2020. As such, Cardano (ADA) blockchain project associate companies and organizations including IOHK and EMURGO have partnered with Ergo.<sup>130</sup> Apart from that, other competitive blockchain platforms such as Ethereum are in existence which has become the leading smart contract platform at present. To sum up, Ergo seems to be an attractive blockchain platform with special features like Sigma protocol as well as ErgoScript programming language. Its governance system and concentration on community-led development make it different from other blockchain platforms. Therefore, for this company to succeed, it will have to compete favourably with other blockchain platforms in order to attract developers and users.

#### 1.10.4 Dash (DASH)

Dash is a decentralized cryptocurrency platform that offers fast, secure and cheap transactions. It was launched as X Coin in 2014 before changing its name to Darkcoin then finally Dash in 2015. The two-tier networks like Bitcoin's protocol enable users to make transactions on this forked system. The first of them is the masternodes, which are servers that offer specialized services to a network. For example, masternodes should verify transactions and enable instant transactions through Instant Send features. The feature helps speed up the process of transaction processing thereby

---

<sup>130</sup> *Is RenQ Finance (RENQ) the next Cardano (ADA)? Experts analyze*, MINT (Mar. 27, 2023), <https://www.livemint.com/brand-stories/is-renq-finance-renq-the-next-cardano-ada-experts-analyze-11679915990644.html> (last visited Mar. 27, 2023).

making Dash an attractive option for those who want fast transaction timing. The second tier consists of ordinary nodes that function like Bitcoin's traditional nodes. These nodes are responsible for verifying transactions and maintaining the integrity of the network. Dash creates an innovative self-governing and self-funding model for itself through Treasury system. This way, they redirect ten percent of block rewards to a decentralized fund meant for developing and promoting the Dash platform. In this manner therefore, external funding sources do not keep it alive nor does it depend on them since community drives its growth rather than any other group or person.<sup>131</sup>

Another field where Dash is different from other blockchains is privacy. Dash enables users to make anonymous payments by using PrivateSend feature. PrivateSend uses mixing technique to conceal identities and transaction history which makes it hard to trace back any connection between them. Moreover, Dash has introduced other effective features that can improve user experience such as Simplified Payment Verification (SPV) protocol. This protocol allows users to transact in Dash without having to download whole blockchain hence improving ease and speed of use. Since its creation, Dash has seen strong growth and is now one of the top cryptocurrencies in terms of market capitalization. For example, Dash has signed partnership agreements with a number of companies and institutions including BlockCypher, Alt Thirty-Six and Bitrefill. On the other hand, critics have accused Dash of being too centralized especially due to the masternodes involvement in it. Additionally, there are other blockchain platforms that pose competition to Dash primarily on user privacy front where Monero and ZCash have surged up.<sup>132</sup> As an overview, Dash is a decentralized cryptocurrency platform that guarantees fast, secure and inexpensive transactions. It's different from many other blockchain platforms because of its self-

---

<sup>131</sup> Understanding Dash Governance — Dash latest documentation, Dash Documentation — Dash latest documentation, <https://docs.dash.org/en/stable/docs/user/governance/understanding.html> (last visited Mar. 27, 2023).

<sup>132</sup> *Cryptocurrency and the Myth of the Trustless Transaction*, SEARCH ELIBRARY :: SSRN, [https://papers.ssrn.com/sol3/Delivery.cfm/SSRN\\_ID3617979\\_code89185.pdf?abstractid=3141605](https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3617979_code89185.pdf?abstractid=3141605) (last visited Mar. 27, 2023).

governance/self-funding model as well as regard for personal confidentiality. Nevertheless, it must solve centralization problems while continuing to develop innovative features that can differentiate it from other blockchain platforms so as to remain competitive in future.

### 1.10.5 Decred (DCR)

Decred (DCR) is a blockchain-based platform launched in 2016 aimed at creating a decentralized, autonomous and sustainable currency. A hybrid consensus mechanism which combines proof-of-work (PoW) and proof-of-stake (PoS) mechanisms allows both miners and stakeholders participate in decision making within the network.<sup>133</sup> Decred's hybrid consensus mechanism is one of the great strengths that it has since it ensures that there is no single entity which can control the network making it more secure and resistant to attacks. Moreover, Decred's built-in governance system ensures that stakeholders vote on proposals for developments in the platform thereby ensuring decentralized decision-making with transparency concerning the future direction of the platform. It should also be noted that Decred has a Treasury System where 10% of block rewards are allocated to treasury fund for development and marketing purposes. This self-funding model allows the platform to be community-owned as opposed to relying on external sources of funding.

For the purposes of improving user experience, Decred have incorporated several features like a Lightning Network that enables instant and cheaper transaction. The platform has also built mobile and desktop wallets that support both PoW and PoS mining which facilitates easy network participation as well as rewards generation by users. As a decentralized community governed platform, Decred is known for its commitment towards empowering communities through decentralization. It has partnered with many companies including BlockFi, Alchemy and BitGo. In addition, it faces stiff competition from other blockchain platforms that largely use hybrid

---

<sup>133</sup> Rakesh Sharma, *What Is Decred (DCR)?*, INVESTOPEDIA (May 1, 2018), <https://www.investopedia.com/news/decred-cryptocurrency-combines-pow-pos/> (last visited Mar. 24, 2023).

consensus mechanisms.<sup>134</sup> In conclusion, Decred is a blockchain-based platform emphasizing decentralization and community governance. Its hybrid consensus mechanism, governance system and a treasury fund make it different from other blockchain platforms. However, to remain competitive in this market, the platform will need to keep on innovating and simplifying its governance model.

## 1.11 Stablecoins:

Stablecoins are those crypto coins or tokens that are made to prevent fluctuations in its value. Unlike other forms of cryptocurrency which could be highly volatile, stablecoins have a set price tied to that of some solid asset such as USD or gold. Examples of stablecoins would include Tether (USDT), USD Coin (USDC), and Dai (DAI).<sup>135</sup> Investors and traders often use these coins as a hedge against volatility, enabling them to facilitate transactions without the instability associated with other cryptocurrencies. There is an array of different types of cryptocurrencies available today which all come with their unique attributes. Researching widely is important so that you can know the benefits and risks associated with each type before buying into it or using it at any point. Some case studies about genres like stablecoin for instance include:

### 1.11.1 Tether (USDT)

Tether (USDT) is a digital currency linked to the value of US dollar.<sup>136</sup> It was created in 2014 and has become one of the most commonly used stablecoin in the cryptocurrency market.<sup>137</sup> Tether

---

<sup>134</sup> *What is Decred (DCR)? The Hybrid Consensus Blockchain - Easy Crypto*, EASY CRYPTO, <https://hub.easycrypto.com/decred-dcr> (last visited Mar. 24, 2023).

<sup>135</sup> Guneet Kaur, *How And Why Do Stablecoins Depeg?*, COINTELEGRAPH (March 14, 2023), <https://coingecko.com/news/how-and-why-do-stablecoins-depeg>.

<sup>136</sup> SECURESHIFT.IO, <https://seureshift.io/blog/usdt-tether-a-stablecoin-for-the-cryptocurrency-world> (last visited on March 15, 2023).

<sup>137</sup> INTERNET VIBIES, <https://www.internetvibes.net/2023/02/20/tether-the-stablecoin-with-a-controversial-relationship-with-the-cryptocurrency-market/> (last visited on March 15, 2023).

Limited issues USDT which according to the company equals reserves held by it for all existing USDT in circulation.<sup>138</sup> Bitcoin, Ethereum, Tron and Algorand among others are the blockchain networks that USDT operates on. However, each of these blockchains has its own currency called USDT but all of them are valued at one USD per piece. In fact, many cryptocurrency traders and investors use USDT as a payment method, trading tool or store of value. USDT was introduced by Tether Limited which is based in Hong Kong in 2014.<sup>139</sup> This corporation claimed that it had a backing of one dollar for each USDT coin from their reserves. The first issuance was done via Bitcoin blockchain while other chains have also been incorporated to issue this token.<sup>140</sup> The widespread popularity that USDT gained quickly amongst cryptocurrency merchants and dealers resulted from the fact that it holds a stable value whilst making payments without necessarily converting to fiat currencies. Nevertheless, since its establishment controversy has surrounded USDT amid fears that Tether Limited may lack enough reserves to fully back all the USDT that are being used today.

Whether it's possible that USDT is entirely backed by reserves is the main argument about it. According to Tether Limited, there are reserves in an amount equal to the number of USDT that has been released. However, many discordant and critical opinions have emerged within the cryptocurrency community. In 2017, Tether Limited fired Friedman LLP, its auditor who was conducting audits on Tether's reserves. It later claimed that the decision was mutual but suspicion arose due to lack of transparency on audit results. According to a study by researchers from Texas University in 2018, Bitcoin price had been manipulated using Tether during the bull run in 2017. This manipulation involved buying bitcoins at opportune times, thus

---

<sup>138</sup> Gareth Jenkinson, *Changes to Tether's Terms of Reserves Raises Fresh Concerns*, COINTELEGRAPH (March 15, 2023), <https://cointelegraph.com/news/changes-to-tethers-terms-of-reserves-raises-fresh-concerns>.

<sup>139</sup> BLOCK FOUNDATIONS CRYPTPO EDUCATION, <https://www.cryptoside.org/tether-are-there-enough-us-dollars-to-back-all-of-the-usdt-tokens-in-circulation/> (last visited on March 15, 2023).

<sup>140</sup> FINANCIAL REVIEW, <https://www.afr.com/markets/currencies/tether-the-1-billion-mystery-near-the-heart-of-the-biggest-bitcoin-exchange-20171206-gzzhmm> (last visited on March 15, 2023).

causing an artificial increase in bitcoin price as per the findings of this research.

In 2019, New York Attorney General's office filed a lawsuit against Tether Limited claiming that they attempted to hide \$850 million loss and deceived investors concerning their reserve levels. The company however rejected such accusations and stated that these funds had been impounded by authorities in different nations. USDT remains a go-to in the cryptocurrency market despite controversies surrounding it. Till date, many exchanges and trading platforms have USDT trading pairs as it still enjoys being one of the top most stablecoin status that is widely used and accepted by the crypto traders and investors.

USDT is structured as a stablecoin, this implies that its value is pegged to that of United States dollar.<sup>141</sup> This stability gets maintained by reserves which Tether Limited claims are equal to the total amount of USDT in circulation. Different blockchains such as Bitcoin, Ethereum, Tron and Algorand support the issuance of USDT. Although each network's USDT is considered a distinct cryptocurrency, they all have an equivalent of one US dollar per each USDT. USDT serves as a medium for transactional purposes within the cryptocurrency market. Since it shares its value with that of USD, people can use it to move money without having to involve fiat currency exchange.

### 1.11.2 USD Coin (USDC)

USD Coin (USDC) was created by Circle in 2018 as part of their project and Coinbase.<sup>142</sup> It's a form of digital asset that seeks to stabilize value in the highly volatile cryptocurrency space by having it pegged against the American dollar. USDC can be described as a stablecoin which is pegged to the US Dollar.<sup>143</sup> Hence making it immune from wild fluctuations experienced by other cryptocurrencies in general. USDC is issued by regulated financial institutions,

---

<sup>141</sup> INVESTOPEDIA, <https://www.investopedia.com/terms/t/tether-usdt.asp> (last visited on March 15, 2023).

<sup>142</sup> Jonathan Gan, *The Circle USDC Depeg*, MEDIUM (March 15, 2023), <https://jonngan.medium.com/the-circle-usdc-depeg-2d239175098f>.

<sup>143</sup> *Ibid.*

ensuring transparency including stability whereby every USDC in circulation is backed one-for-one by the equivalent number of dollars held at these institutions across multiple bank accounts.

Quick and secure transactions are possible on the Ethereum blockchain, which underlies USDC. It is a form of ERC-20 token, thus compatible with numerous wallets and exchanges that support ERC-20 tokens, making it simpler to hold, transfer and trade USDC. Crypto market can use USDC as its payment and trading instrument. A lot of sellers and service providers accept it as a form of payment while other users can use it to acquire goods or pay for services online. Furthermore, sending USDC anywhere in the world is a piece of cake because all you need is the recipient's cryptocurrency wallet address.. Its stability and liquidity make USDC very popular among crypto investors. It is generally accepted on many exchanges, hence one can use it to trade various cryptocurrencies thereby providing an opportunity for easy diversification of investment portfolios.

Some controversies have been associated with this token. In 2019, Circle disclosed that some reserves backing up USD had been used to invest in high-risk assets thereby raising concerns about the stability of this token. Nonetheless, Circle noted that their reserves made only a small part of their investments, thus did not put USD at any risk. USDC has also been critiqued by some in the cryptocurrency community who claim that it is not truly decentralized because it is issued by regulated financial institutions. In addition, there are concerns about the transparency and the audit process for USDC's reserves.

USDC is a stablecoin meant to provide stability and liquidity in the volatile cryptocurrency market. It runs on Ethereum blockchain and maintains its value with respect to USD and provides transparency as well as stability.<sup>144</sup> USDC can be used for various cryptocurrency operations in many exchanges since it is widely accepted. However, despite this it still remains one of the most popular stablecoins within cryptocurrency market due to its

---

<sup>144</sup> Zac McClure, *A Simple Guide to Stablecoin Taxes for 2023*, TOKENTAX (March 15, 2023), <https://tokentax.co/blog/how-are-stablecoins-taxed>.

secureness and stability as compared with traditional cryptocurrencies.<sup>145</sup>

### 1.11.3 Dai (DAI)

DAI which was launched by MakerDAO,<sup>146</sup> a decentralized autonomous organization (DAO), operates on Ethereum blockchain that was invented as a stablecoin in 2017. Unlike other stablecoins, it does not have any asset backing it but its value relative to USD is maintained through smart contracts. DAI is a decentralised stablecoin, which has a number of advantages over standard stablecoins, it does not depend on any particular asset to retain its worth, making it less volatile and more immune to market changes. DAI's stability is achieved through a contract system that creates and manages the supply of DAI depending on how much collateral is held in CDPs. This makes DAI open for anyone's scrutiny since anyone can read the smart contract code running on the Ethereum blockchain thereby making it more trustworthy.<sup>147</sup> DAI can be used both as a means of payment and trading instrument being widely accepted by various cryptocurrency exchanges. It allows for traders to buy or sell other cryptocurrencies, therefore becoming a good way to diversify investment portfolios. In addition, just like any other cryptocurrency, DAI can be used to pay for goods and services online thus it can be employed as an alternative option for e-commerce.

Some controversies have surrounded DAI especially with regard to its reliance on Ethereum network. The Ethereum network sometimes gets congested during periods of high network usage leading to slow transactions and high gas fees. These high gas fees may prevent some users from creating and transacting in DAI hence reducing its accessibility and adoption rate. Another controversy surrounding DAI is that it depends on a system of smart contracts to maintain its stability. The smart contract system has been effective so

---

<sup>145</sup> Rose Tillerson, Understanding Tether's Role As A Stablecoin, THE NEWS GOD (March 15, 2023), <https://thenewsgod.com/understanding-tethers-role-as-a-stablecoin/>.

<sup>146</sup> MAKERDAO, <https://makerdao.com/en/> (last visited on March 15, 2023).

<sup>147</sup> CRYPTO.COM, <https://crypto.com/price/multi-collateral-dai> (last visited on March 15, 2023).

far, but not without risks and vulnerabilities. Smart contract systems are still evolving, with possible bugs or security breaches.

In conclusion, DAI is a decentralized stablecoin that offers various advantages over traditional stablecoins. It ensures the transparency<sup>148</sup> and stability of cryptocurrencies without relying on any particular assets. DAI is versatile and widely used, making it an excellent cryptocurrency for conducting transactions with. Although there have been some controversies about it, DAI remains a popular stablecoin and it is expected to grow as the Ethereum network gains more popularity.

#### 1.11.4 True USD (TUSD)

TrueUSD (TUSD)<sup>149</sup> is a stablecoin that was launched in March 2018 by TrustToken, which allows asset tokenization services on blockchain-based platforms. TrueUSD has its value backed up by US Dollars at a ratio of 1:1,<sup>150</sup> thus making it attractive to many who want to trade or invest in digital assets without being exposed to volatility of crypto markets. Different from other stablecoins, there are several advantages of choosing TrueUSD as a means of value exchange. First and foremost, it is fully collateralized by the US Dollar. Consequently, it is an entirely safe and secure digital currency. It therefore implies that every TUSD coin which is in circulation has its corresponding amount of money held in custody thus making it open and answerable to everyone. The second reason why one should consider this cryptocurrency is that there is total openness about its operations. TrustToken often provides confirmation documents to show the numbers of USD kept in an escrow account, so that it ensures TUSD keeps being backed up all through. Also, due to TrueUSD being a highly regulatory compliant stablecoin it means TrustToken fully adheres with the legislation about money

---

<sup>148</sup> Elizabeth Napolitano, Finance MakerDAO Weighs Using Emergency Switch to Prevent Future DAI Depegging, COINDESK (March 15, 2023), <https://www.coindesk.com/business/2023/03/13/makerdao-weighs-using-emergency-switch-to-prevent-future-dai-depegging/>.

<sup>149</sup> TRUEUSD, <https://www.trueusd.com/> (last visited on March 15, 2023).

<sup>150</sup> COINBASE,

<https://www.coinbase.com/price/trueusd#HistoryofTrueUSD> (last visited on March 15, 2023).

laundering. Another advantage of TrueUSD over other stablecoins is that it can be used for different purposes such as peer-to-peer payments, trading on cryptocurrency exchanges or online purchases. It is well recognized in most top crypto currency exchanges and can be swapped for numerous types of cryptocurrencies thereby allowing users to diversify their investment portfolios.

TrueUSD has had some problems mainly because of its centralized nature. TrueUSD unlike some others who are backed by decentralized entities has a company backing and issuing it (TrustToken). Consequently, they have full control over the supply and circulation process which raises issues about decentralization and trustworthiness thereof. TrueUSD's reliance on one custodian for the US Dollars held in escrow is yet another controversy. TrustToken, however, introduced stringent security measures aimed at safeguarding this money from any kind of mismanagement or fraud. When it comes to being safe and having a lot of uses then other stablecoins might not be good enough. It is a stablecoin with full backing by US dollars and regulatory compliance assured. With all these, TrueUSD can be classified as an honest stablecoin for trading or investing in crypto currencies.<sup>151</sup> Nevertheless, its centralized nature has caused some controversies, while the requirement that there can only be a single guardian of US dollars held in escrow may make some investors wary of using it. Despite these concerns however, TrueUSD remains one of the most popular stablecoins and this is expected to continue as cryptocurrency market matures further.



---

<sup>151</sup> CRYPTO.COM, <https://crypto.com/price/trueusd> (last visited on March 15, 2023).





# Chapter 2

## Blockchain: The Backbone of Cryptocurrencies

*"Not understanding blockchain, it's going to smack you down and make you bleed."*

— **Mark Cuban**<sup>152</sup>

### Synopsis

- 2.1 An Overview of Blockchain Technology
- 2.2 Blockchain Explained: From Genus to Species

### 2.1 An Overview of Blockchain Technology

Cryptocurrencies rely upon the blockchain technology that ensures accurate and safe records.<sup>153</sup> Blockchain is a digital ledger that permits numerous participants to maintain a shared database without a central authority, thus minimizing fraud risks and building

---

<sup>152</sup> Mark Cuban, *Not understanding blockchain, it's going to smack you down and make you bleed.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

<sup>153</sup> CRYPTO CIRQLE, <https://cryptocircle.com/cryptocurrency-and-blockchain-technology> (last visited on March 15, 2023).

confidence in its credibility.<sup>154</sup> From a technical standpoint, a blockchain is an open record of all transactions occurring over a network of computers.<sup>155</sup> A block can contain several transactions while it cannot be modified or deleted once it has become part of the chain without consensus from other computers in the network.<sup>156</sup> The block is verified by multiple nodes within the network who employ intricate algorithms to ensure that the system remains secure and reliable. In layman's terms, blockchain serves as an online ledger where transaction data are recorded between two parties.<sup>157</sup> When added to the rest of blocks, each block can never be changed once added to chain, hence they are immutable.<sup>158</sup>

Blockchain works on trust-less protocol, which means that no central authority maintains such ledger<sup>159</sup> but rather through different nodes which secures its safety, making it one of most secure and transparent systems ever made. The advantages of blockchain are not limited to cryptocurrencies only, since this technology has the potential to change supply chain management, voting systems and digital identity verification.<sup>160</sup> Efficiency, cost reduction and security improvement in many industries can also be facilitated by blockchain technology.<sup>161</sup> In essence, it is a highly secure and transparent distributed ledger system that provides the foundation for cryptocurrencies. It allows multiple parties to maintain a collectively

---

<sup>154</sup> COMO DIGITAL LIFE, <https://www.comodigital.life/dk-blockchain> (last visited on March 15, 2023).

<sup>155</sup> COLLABNIX, <https://collabnix.com/what-is-blockchain-technology-and-how-does-it-work/> (last visited on March 15, 2023).

<sup>156</sup> INTERCOM.HELP, <https://intercom.help/sharering-ltd/en/articles/5015127-what-is-blockchain-technology> (last visited on March 15, 2023).

<sup>157</sup> Shiv Gupta, *Could Blockchain Improve Cybersecurity Of Supply Chains?*, TOP WEB DEVELOPMENT COMPANIES (March 15, 2023), <https://topwebdevelopmentcompanies.com/blockchain/could-blockchain-improve-cybersecurity-of-supply-chains>.

<sup>158</sup> CERT-TRACE, <https://cert-trace.com/the-power-of-blockchain/> (last visited on March 15, 2023).

<sup>159</sup> Christy J. Varghese, *What is Blockchain Technology? - The Detailed Guide*, Sunstone (March 15, 2023), <https://sunstone.in/blog/blockchain-technology>.

<sup>160</sup> *Ibid.*

<sup>161</sup> BISRESEARCH, <https://bisresearch.com/news/smart-energy-drive-revamping-oil-and-gas-industry-with-blockchain-technology> (last visited on March 15, 2023).

owned database without the use of a central authority and that establishes the trust among them and mitigates against fraud risks. Technically, though complex, blockchain's applicability beyond cryptocurrencies is countless, hence its transformative possibilities are on the wide range of sectors.

### 2.1.1 Exploring Blockchain Types and Real-World Applications

Different types of blockchain technology exist to suit different industries' needs. Here are examples for four typical cases:

- A. Layer 1 Blockchains:** These represent the most common type of blockchains that are used as backbones for most cryptocurrencies. They are self-supporting, autonomous and operate under their own consensus algorithms. Examples include Bitcoin and Ethereum, which are Layer 1 blockchains.<sup>162</sup>
- B. Layer 2 Blockchains:** These blockchains are “in-built Layer 1 blockchains” for tackling scalability and speed hurdles. They employ methods such as payment channels, state channels, or side-chains that are off-chains which makes transactions more rapid and efficient. For instance, Lightning Network and Polygon are examples of Layer 2 blockchains.
- C. Distributed Ledger Technology (DLT):** This is a category of blockchain that allows multiple parties to maintain a shared database without having a central authority. It can be applied across various sectors such as supply chain management, voting systems and digital identity verification. The Hyper-ledger Fabric and Hedera (HBAR) are the examples of DLT blockchain.
- D. Hybrid Blockchains:** This type of blockchains combine both public and private block chains, hence addressing the disadvantages present in both models. They offer flexibility to industries, hence they can be used across the different

---

<sup>162</sup> LINKEDIN, [https://www.linkedin.com/posts/eya-elkamel-31a87b199\\_security-blockchain-network-activity-6967835281810989056-IyNx/?originalSubdomain=tn](https://www.linkedin.com/posts/eya-elkamel-31a87b199_security-blockchain-network-activity-6967835281810989056-IyNx/?originalSubdomain=tn) (last visited on March 15, 2023).

sectors. An example of this is Binance Smart Chain which is a hybrid blockchain.<sup>163</sup>

### 2.1.2 Consensus Mechanisms: The Heartbeat of Blockchain Networks

Blockchain technology secures the network through many kinds of consensus protocols. There are four common types of blockchain consensus mechanisms which include as follows:

- A. Proof of Work (PoW):** This is the most well-known consensus mechanism and is widely used in cryptocurrencies like Bitcoin, Litecoin, and Ethereum (before ETH 2.0). Miners involve themselves in solving complex mathematical problems in order to validate transactions as well as add new blocks to the blockchain in PoW.<sup>164</sup>
- B. Proof of Stake (PoS):** It is an alternative for PoW that is used by a number of popular blockchain networks such as Ethereum 2.0 and Cardano. The validators selected for PoS, validate transactions according to the amount of cryptocurrency they have or hold.<sup>165</sup>
- C. Proof of Believability (PoB):** This is a kind of consensus mechanism which combines PoW with PoS, and it is used by NEO and VeChain among other blockchains. Instead of relying only on computational power or the number of cryptocurrencies held, this determines who validates the succeeding block using a reputation system.
- D. Delegated Proof of Stake (DPoS):** DPoS is another type of PoS that has been adopted by blockchain networks like EOS and Tron. Within this system, those having tokens are allowed to elect representatives for the purpose of validating transactions on their behalf. Thus, influence of particular

---

<sup>163</sup> SCALAC, <https://scalac.io/crypto-dictionary/> (last visited on March 15, 2023).

<sup>164</sup> CRYPTODIGS, <https://www.cryptodigs.in/2023/03/understanding-blockchain-technology-in.html> (last visited March 14, 2023).

<sup>165</sup> PROGRAMMING INSIDER, <https://programminginsider.com/ethereums-shift-from-proof-of-work-pow-to-proof-of-stake-pos-consensus-algorithm/> (last visited on March 14, 2023).

delegate is determined by the number of votes he or she receives.

In addition to that, there are other consensus mechanisms like Practical Byzantine Fault Tolerance (PBFT) and Proof of Authority (PoA) that are increasingly being used in different industries. In conclusion, different types of consensus mechanisms are applied in blockchain technology to secure and make network reliable. Every consensus mechanism has its own unique advantages and characteristics, while different blockchain networks use different types of consensus depending upon their requirements.<sup>166</sup>

## 2.2 Blockchain Explained: From Genus to Species

With blockchain technology, several innovative applications and use cases have been developed across several sectors. The utilisation of the blockchain technology is currently seems to be at its all time high as from the factual scenario, it can be rightly witnessed that a large number of Web3 developers are working at their best capacity for the purpose of the creation of various projects on the blockchain technology. Some key examples include:

**A. Non Fungible Tokens (NFTs):** Non-Fungible Tokens (NFTs) are one-off computer files that are saved in blockchain.<sup>167</sup> Unlike Bitcoin or Ethereum which are cryptocurrencies, NFTs are not interchangeable because each of them stand for unique products such as artistic work, music or virtual property. NFT is a kind of blockchain-based asset that enables creators to prove their digital works' ownership and authenticity, while buyers can possess the only available pieces. Blockchain platforms like Ethereum, Binance Smart Chain among others allow creation and transaction of NFTs. The process of making an NFT is referred to as minting during which a distinct electronic item is created and tokenized on the

---

<sup>166</sup> UKDISS.COM, <https://ukdiss.com/examples/blockchain-in-banking.php> (last visited on March 14, 2023).

<sup>167</sup> RENFT, <https://www.renft.io/faq> (last visited on March 14, 2023).

blockchain network.<sup>168</sup> In this way, a digital proof of ownership is made that can be purchased, sold as well as exchanged.<sup>169</sup>

The art world has been one of the most common uses for NFTs. They allow artists to sell their digital work as single pieces that cannot be copied easily, unlike just selling it as a file.<sup>170</sup> It was in March, 2021 that digital artist, 'Beeple' made history after his artwork's NFT auctioned at Christie's for a record-breaking \$69 million.<sup>171</sup> This event brought into focus the possibility of valuing digital art materials with similar worth as customary artworks.<sup>172</sup> Another industry where NFTs are being used is the music sector whereby artists can sell their unique versions of digitalized music, concert tickets and other collectibles. In April 2021, Grimes sold nearly \$6m worth of NFTs including one-off video and original music compositions. This showed how NFTs could be used to generate incomes for artists and other creative products. Also, gaming and virtual worlds may be another potential use case for NFTs. These platforms may use NFTs to represent exclusive items such as weapons and other in-game assets that players can purchase or sell to others. This allows users to earn money by playing games within this economy created by the game world or platform.

However, with the rise of NFTs, environmentalists have been worried about their effects on the environment. The procedure of minting an NFT on the Ethereum blockchain consumes a lot of energy and computing capacity leading to concerns over carbon footprints left by NFTs.<sup>173</sup> Moreover, high prices for certain NFTs

---

<sup>168</sup> HOULTECH, <https://www.houltech.com/post/the-environmental-impact-of-nfts-examining-the-carbon-footprint-of-digital-art> (last visited on March 14, 2023).

<sup>169</sup> Saima Asim, *The Role of Blockchain Technology in NFTs*, ASWAD.TECH (March 14, 2023), <https://aswad.tech/the-role-of-blockchain-technology-in-nfts/>.

<sup>170</sup> BRIGHTSCOUT, <https://www.brightscout.com/insight/use-cases-for-nfts-in-2023-where-are-we-heading-to> (last visited on March 14, 2023).

<sup>171</sup> COINDOO, <https://coindoo.com/nft-for-dummies/> (last visited on March 14, 2023).

<sup>172</sup> GLOBAL FINANCE FANTASER BLOGS, <https://www.fantaserblogs.com/5-reasons-why-nfts-are-the-future> (last visited on March 14, 2023).

<sup>173</sup> FOREX24HR.COM, <https://www.forex24hr.com/wstories/what-is-nft/> (last visited on March 14, 2023).

have raised concerns regarding speculation and bubble in the market. All in all, NFTs are a new frontier within blockchain and digital assets.<sup>174</sup> There is still much to be learned about them but they allow owners and sellers of unique digital assets to do so in another way than before.

## B. Collectibles, Metaverse Virtual Lands, DAOs

The collectible sector, metaverse virtual lands and decentralized autonomous organizations (DAOs) are among the most exciting rapidly evolving areas in cryptocurrency and blockchain technology today. Cryptocurrency collectibles also known as Non-Fungible Tokens (NFTs) are individual digital items that represent ownership over something specific or art piece.<sup>175</sup> Each NFT is original with its ownership and provenance being verified through a blockchain system, thus making it possible for collectors to own and trade digital assets that possess scarcity or authenticity that was previously unattainable. As an illustration, in march 2021, a digital artwork of NFT by Beeple was purchased at Christie's auctioneers for \$69m, a record.<sup>176</sup> In the same vein, this market milestone demonstrated the growing demand for unique digital assets.

Moreover, There are virtual lands and real estate in metaverse or virtual world. The buyer uses cryptocurrency while buying and selling such virtual lands which have gained huge popularity among online game enthusiasts especially gamers like digital artists. Virtual lands are often used to host virtual events, exhibitions, games and some become popular places where cryptocurrency enthusiasts meet. Decentraland is one example of a popular metaverse platform that is built on the Ethereum blockchain.<sup>177</sup> It also enables users to buy/sell

---

<sup>174</sup> INFO WORLD, <https://www.infoworld555.com/2023/02/the-basics-of-nfts-understanding-non.html> (last visited on March 14, 2023).

<sup>175</sup> MIRROR.XYZ, <https://mirror.xyz/0xd22bd1d396C130A9BdB11D9cD278b93903B3F234/hWdvnVRwyGhtIqWJQpIImpicPq37xal-aFB72ZMRU> (last visited March 14, 2023).

<sup>176</sup> DIGIBAAP, <https://digibaap.com/why-do-we-need-to-prepare-for-nfts> (last visited March 14, 2023).

<sup>177</sup> Rajanikant Swami, *Web 3.0: What and Future of Web*, MEDIUM (March 14, 2023), <https://medium.com/@nicerajanikant/web-3-0-what-and-future-of-web-71b6549b4de8>.

land virtually, create buildings/structures within that space and interact with other people in that area. At present time, the platform has an expanding community of users and developers as new projects and virtual events are launched periodically there.

Decentralized Autonomous Organization (DAO) is a kind of organization that functions on the basis of smart contracts on the blockchain.<sup>178</sup> Such DAOs are meant to be completely transparent, democratic and decentralized, where authority for decision-making is given to all members equally. Members can then vote on proposals as well as amendments to the rules and operations of their organizations in proportion to their holdings of digital assets.<sup>179</sup> For instance, MakerDAO is a successful DAO built on the Ethereum blockchain. It is a decentralized lending platform which enables users to borrow or lend cryptocurrency using DAI, which is a stablecoin.<sup>180</sup> This platform operates under a decentralized autonomous organization (DAO) where members are capable of voting for propositions and changes in rules for platform operation.

To sum up, there are three exciting sectors within the cryptocurrency and blockchain space and those are Collectibles, Metaverse Virtual Lands, and DAOs. They all are evolving rapidly. All these areas have distinct use cases that differentiate them from each other, however, they have potential for innovation as well as growth that makes them interesting in terms of development over this decade.

### C. Cryptocurrencies: Coins & Tokens

Cryptocurrencies are virtual or digital currencies which make use of cryptography in ensuring security while operating outside central

---

<sup>178</sup> COIN MARKET CAP, <https://coinmarketcap.com/community/articles/63ffed8b6df569597cd748a5> (last visited March 14, 2023).

<sup>179</sup> Ernest Akakpo, *DAOs (Decentralized Autonomous Organizations)*, LINKEDIN (March 14, 2023), <https://www.linkedin.com/pulse/daos-decentralized-autonomous-organizations-ernest-akakpo/>.

<sup>180</sup> Shraddha Khattri, *DAOs: A New Way of Doing Business in the Digital Age*, BLOCKCHAIN LAWYER, <https://www.blockchainlawyer.in/post/daos-a-new-way-of-doing-business-in-the-digital-age>.

banks.<sup>181</sup> The two main categories into which they fall are coins and tokens. Coins are just cryptocurrencies with their own blockchain network and they can be exchanged or may be used as store of value.<sup>182</sup> Bitcoin is the most famous coin, created in 2009, and it has become the largest cryptocurrency by market capitalization. Other popular coins include Ethereum, Bitcoin Cash, Litecoin, Ripple, etc. On the other hand, tokens are cryptocurrencies that operate on an existing blockchain network, such as on Ethereum blockchain there are thousands of tokens that have been minted so far.<sup>183</sup> They are created through initial coin offerings (ICOs) or other fundraising mechanisms for crowdfunding purposes among others utility governance or security. Examples of popular tokens include ERC-20 tokens such as Binance Coin, Chainlink and Tether and Non-Fungible Tokens (NFTs) like CryptoKitties and Axie infinity.

Different coins and tokens have varying characteristics including their transaction speed, scalability security and governance among others. For instance bitcoin is known for its slow transaction processing time as well as limited scalability, while Ethereum is known for smart contract functionality plus its broader use cases. Researching and understanding the differences between these coins and tokens is important before investing in them by investors. Furthermore, cryptocurrencies are speculative assets, and their values can fluctuate widely because of different factors such as market demand, regulatory changes, technological developments, and media attention. Therefore, it is important for investors to carefully consider their risk tolerance and investment goals before investing in cryptocurrencies and they may only invest what they can afford to lose as currently the crypto ecosystem is considered to be a very novel ecosystem, hence the investments might tend to be highly risky.

---

<sup>181</sup> Mia Tolusic, *Are Tokenised Assets Crypto?* LINKEDIN (March 14, 2023), [https://www.linkedin.com/posts/mia-tolusic\\_tokenized-blockchain-decentralized-activity-7028766098623746048-TBf-/?originalSubdomain=pr](https://www.linkedin.com/posts/mia-tolusic_tokenized-blockchain-decentralized-activity-7028766098623746048-TBf-/?originalSubdomain=pr).

<sup>182</sup> PHEMEX, <https://phemex.com/blogs/crypto-token-vs-coin> (last visited March 14, 2023).

<sup>183</sup> 0PERCENT, <https://0percent.com/cryptocurrency-security-or-utility/> (last visited March 14, 2023).

## D. Play-to-earn

Blockchain technology has made the play-to-earn (P2E) possible by bringing about this new thing in the gaming world. Under this model, players get rewarded with tokens and these tokens can be exchanged for other tokens or digital currencies. Blockchain-based gaming platforms have emerged over the past years, hence rising the popularity of P2E. Blockchain-based gaming platforms are mainly online game-playing platforms that are supported by blockchain technology. They allow gamers to earn rewards or tokens by finishing certain tasks or reaching some particular objectives while playing the game. These rewards are convertible into real money or other digital goods. This implies that anyone who has a passion for gaming can now use his/ her skills as a source of income through monetizing them.

Axie Infinity is one of the most popular P2E platforms, a game that uses blockchain technology and has become the talk of the gaming community. Here, the players gather Axies – creatures with a special fantasy breed – to compete against one another.<sup>184</sup> AXS is the cryptocurrency of this game, which can be won in battles, missions or buying creatures. In recent months, however, AXS's price has jumped considerably and it is now seen as one of the most valuable cryptocurrencies in existence. The Sandbox is also another P2E platform which people like using. It is a decentralized virtual gaming world where players can create buildings and monetize their own games.<sup>185</sup> Hence, you can earn SAND by creating content or participating in game economy. Additionally, collaborations between The Sandbox and top brands including Atari and Square Enix have made it into one of the most promising P2E platforms on market today.

P2E is not only confined to gaming consoles, but it also has applications in other sectors such as education and social media. Take the cryptocurrency-based social media, Steemit for example, it pays users in cryptocurrency for creating and sharing posts on its platform.

---

<sup>184</sup> WEB 3O'CLOCK, <https://web3oclock.com/fantasy-game> (last visited March 14, 2023).

<sup>185</sup> Rakesh, *Top 10 Bitcoin Alternatives With Growth Potential in 2023*, RAKESH OFFERS (March 14, 2023), <https://rakeshoffers.com/>.

This encourages members to post quality information and interact with the site thus granting a livelier community. P2E could be a game-changer when it comes to our approach towards both work and play. It lets people monetize their talents and hobbies, offering an alternative income stream for those who cannot find conventional jobs. As new P2E platforms rise up, we anticipate that more individuals will become part of this emerging market.

## E. AssetFi Protocol

In essence, AssetFi is a Decentralized Finance (DeFi) ecosystem that introduces an innovative method for investors to buy or sell illiquid assets. The marketplace utilizes blockchain technology coupled with smart contracts making it safe and transparent for various forms of investments like private equity, real estate or venture capital etc. The AssetFi protocol runs on a peer-to-peer network, which means investors can interact directly with other investors without the need for middlemen like brokers or investment banks. This can reduce traditional investing costs such as fees and commissions and also improve liquidity of normally illiquid markets. In addition to this, AssetFi also utilizes the process of tokenization where it converts assets into digital tokens that can easily be traded on the respective blockchain network.<sup>186</sup> Tokenization allows fractional ownership of assets, thus enabling clients to purchase small parts of assets that were previously only available for individuals with high net worth as well as institutional investors.

AssetFi has many features such as a marketplace to buy/ sell assets, decentralized exchange to trade tokens and an asset management dashboard for investments tracking. It is fueled by a native utility token used for governance, staking and transactional fees.<sup>187</sup> Real estate tokenization is a demonstration of AssetFi in action. Real estate has, traditionally, been an asset with limited liquidity, characterized by high thresholds and few opportunities for

---

<sup>186</sup> FOREM, <https://forem.dev/bookerrjancee/ultimate-guide-to-asset-tokenization-exploring-the-technical-aspects-and-benefits-13nl> (last visited March 14, 2023).

<sup>187</sup> 1INCH, <https://help.1inch.io/en/articles/5230030-how-to-use-1inch-on-polygon-formerly-matic-network> (last visited March 14, 2023).

small-scale investors. However, AssetFi protocol enables the division of real estate into digital tokens which can be easily traded on a blockchain, whereby fractional ownership shares of property are sold to prospective buyers. By doing so, there will be unlocked investment prospects and increased liquidity in the real estate market as well.<sup>188</sup> Another instance is the tokenization of private equity. Private equity investments are usually meant for wealthy individuals or institutional investors only.<sup>189</sup> On the other hand, when it comes to AssetFi then smaller investors can participate by buying fractions of a company's equity through digital assets known as tokens. These developments may lead to more investment avenues and improve illiquid nature of this market. Assetfi is an innovative approach because it applies blockchain technology as well as tokenization for further possibilities that appeal to entrepreneurs and increase liquidity in typically non-liquid markets.

## F. DeFi.

DeFi is a financial system that is dependent upon the blockchain technology that does not involve middlemen like banks.<sup>190</sup> Instead, DeFi uses smart contracts that automatically execute code when certain conditions are met. This creates a trust-less and transparent system allowing users to directly engage with the network. Just in the last few years, DeFi has flourished with diverse applications including lending & borrowing, decentralized exchanges, yield farming and stablecoins. Here are some examples of DeFi projects and their respective use cases:

- **Aave:** A decentralized lending platform for various crypto loans and borrowings.<sup>191</sup>

---

<sup>188</sup> MUPHY MUSTAPHA, <https://www.muphymustapha.com/how-to-own-a-fraction-of-a-property-for-free> (last visited March 14, 2023).

<sup>189</sup> IFSA PRIVATE EQUITY, <https://ifsaprivateequity.com/2023/01/12/5-key-private-equity-risks-and-how-to-manage-them/> (last visited March 14, 2023).

<sup>190</sup> MEDIUM, <https://medium.com/@KuWallet/cefi-vs-defi-which-is-better-kucoin-wallet-web3-academy-e4d054318ccf> (last visited March 14, 2023).

<sup>191</sup> UNLEASHEST, <https://unleashest.com/investing-in-the-best-defi-projects-of-2023/> (last visited March 14, 2023).

- **Uniswap:** A decentralized exchange that allows anyone to trade cryptocurrencies without intermediaries.<sup>192</sup>
- **Compound:** This is a protocol for borrowing and lending, earning interest on cryptocurrency holdings or taking out loans by putting down collateral.<sup>193</sup>
- **MakerDAO:** It's a decentralized platform where you can create stable coins using your own crypto assets as collateral.<sup>194</sup>
- **Yearn Finance:** This is an amalgamation of different DeFi protocols which optimize yield farming strategies for users.
- **Synthetix:** It is a protocol that allows users to trade synthetic assets while tracking the value of real world asset e.g. stocks, commodities and currencies.<sup>195</sup>
- **Curve Finance:** It acts as a decentralized exchange specialising in stable coin trading making it easy for people to trade at low fees.

One of the merits of DeFi is its feature of being permission-less which means that anyone can join without needing permission or middlemen. This opens up financial opportunities to people who may not have had access to traditional financial services in the past.<sup>196</sup> However, DeFi is not without its risks. Any smart contract's bug or hack might lead to loss of funds, and hence due diligence would be required from users interacting with DeFi protocols because there are no legislations guiding it. On the other hand, DeFi holds the potential to continue the experiencing growth, regardless of these risks and could disrupt conventional finance for many years ahead.

---

<sup>192</sup> CRYPTO WAVE WORLD, <https://cryptowaveworld.com/for-beginners/2093/what-is-defi-and-how-does-it-work/> (last visited March 14, 2023).

<sup>193</sup> *Ibid.*

<sup>194</sup> ENCRYPTOOL, <https://www.encryptool.com/2023/02/what-is-defi-and-how-defi-works.html> (last visited March 14, 2023).

<sup>195</sup> VERADIVERDICT, <https://www.veradiverdict.com/p/synthetic-assets-on-blockchain> (last visited March 14, 2023).

<sup>196</sup> UNLEASHEST, <https://unleashest.com/investing-in-the-best-defi-projects-of-2023/> (last visited March 14, 2023).

### **G. FaaS (Farming-as-a-Service)**

The decentralized financial (DeFi) concept of farming-as-a-service (FaaS) enables users to get returns on their digital currency possessions via liquidity provision into various pools. On a basic level, this is where users lend their digital assets to those who wish to engage in trading with them and as a result, the lenders receive a fraction of the platform's total trading fees.<sup>197</sup> In other words, when they participate in yield farming and interpose liquidity to different pools in order to earn extra tokens, they are essentially using the same FaaS model. However, it is limited to providing liquidity for trading purposes alone. Therefore, it serves as an alternative for centralized exchanges popularly known to be prone to hacking and security problems. Hence, users can maintain asset control and mitigate externalities related losses by embracing decentralized platforms.

Also, investors participating in FaaS can enjoy higher interests, since trading charges might be quite substantial. This way, they may gain significant income from lending out their crypto-assets. Some of the FaaS platforms include Uniswap, SushiSwap, Balancer and more. By doing so, users receive a portion of earnings from the fees charged by the platform. Also, different platforms have distinct features and benefits hence it is important to do some research before deciding on which one to use.

All in all, FaaS is a new concept in DeFi that helps users earn interest on their crypto assets while supporting decentralized trading infrastructure growing. However, like any other investment opportunity, users should assess risks carefully and consider possible profits before delving into FaaS.

### **H. Artificial Intelligence (AI) Crypto**

AI Crypto engages with artificial intelligence and cryptocurrency sector as an interdisciplinary field. Its aim is to design sophisticated machine learning algorithms and data analysis tools for application in various aspects of the cryptocurrency industry such as trading, managing portfolios as well as assessing risks among other

---

<sup>197</sup> UPHOLD, <https://uphold.com/en-us/prices/crypto/orion-protocol>, (last visited March 14, 2023 05:30AM).

things. The development of predictive models for the pricing of cryptocurrency is one area where AI Crypto focuses on. As a result, traders become more capable in deciding when to purchase and sell these digital assets by analyzing a great deal of historical data through AI algorithms which indicate patterns and trends that may not be easily seen by human researchers.

Portfolio management is another application for AI Crypto. Through machine learning algorithms that assess how various cryptos have done, it becomes possible for investors to design portfolios that are much more diversified as well as better optimized with regards to risk/ return trade-offs.

Security and fraud detection are other applications of AI Crypto in the cryptocurrency sphere. By examining the user behaviour and transaction history patterns, the AI can recognize warning signs about possible security breaches and avoid fraudulent activities. The companies that are working in the AI Crypto space include but are not limited to:

- **Endor Protocol:** This platform applies blockchain technology coupled with artificial intelligence features to offer correct forecasts that aid different aspects.
- **Numerai:** This is a hedge fund which uses machine learning tools specifically designed for investment management focusing on cryptocurrencies.
- **SingularityNET:** An Artificial Intelligence approach that aims to make advanced technologies openly available through decentralization, while allowing for collaboration between developers and users.
- **Cortex:** A decentralized AI platform utilizing blockchain technology to enable developers build and deploy machine learning models.<sup>198</sup>

In general, majorly the future of the cryptocurrency lies in AI Crypto that has been growing at an extremely high pace at the moment. This is because of the fact that as more firms and investors

---

<sup>198</sup> CORTEX, <https://cortexlabs.ai/> (last visited on March 14, 2023).

become aware of how much potential there is for AI in this field, it will lead to further innovation and development.

## I. Fan Tokens

Fan tokens refer to digital assets given by a particular sports club or team to its supporters with whom they can make some team choices or participate in some reasonable and limited activities. These often run on blockchain-based systems and provide access to specific contents, goods, and experiences as well as conduct voting or polling around the fan. Sporting teams are now using fan tokens as a means of interacting with their fans while making money. FC Barcelona, Paris Saint-Germain (PSG), AC Milan among others have issued fan tokens in the football world whereas Boston Celtics from NBA are famous examples. One of the most favored platforms of fan tokens is Socios.com, which allows fans to purchase and exchange the same for various teams using their indigenous Chiliz (CHZ) cryptocurrency. Moreover, Socios.com has also introduced a mobile app that gives followers an opportunity to participate in team related decisions including jersey design or promotional campaigns for players.

Another platform that sells fan tokens is Fan Controlled Football (FCF), a startup football league where fans can own and manage their own teams. FCF relies on blockchain and fan tokens to allow supporters to decide things like team names, logos, kits as well as selecting players during drafts and making play calls during games. Fan tokens are generally a whole new approach through which sports teams can connect with their fans offering them exclusive experiences and rewards.<sup>199</sup> Given the ever-increasing popularity of blockchain technology along with cryptocurrencies, it's highly likely that more leagues as well as teams will start issuing fan tokens so as to interact with fans while making money out of their brands.

## J. Move-to-Earn

Move-to-earn is a new trend in the cryptocurrency industry where users participate in fitness activities to get cryptocurrency

---

<sup>199</sup> Khor Win Win, *Chiliz - Bringing Power Back To The Fans*, CoinGecko 1, 1-10 2021, <https://assets.coingecko.com/reports/Research/Chiliz-Bringing-Power-Back-To-The-Fans.pdf>.

rewards. It combines blockchain technology with the concept of earned incentives for physical actions. The main aim is that by fulfilling specific responsibilities or accomplishing certain requirements, they can be given these awards in the form of cryptocurrencies which can help them purchase tangible goods or services or exchange with other virtual currencies. One of the most well-known move-to-earn programs is Sweatcoin. Sweatcoin is an application for smartphones that traces people's exercise and grants them sweatcoins, which are a kind of electronic coinage, in return for every step made. Its purpose is to motivate individuals to live healthier lives while providing them with opportunities to acquire digital money.

Recently, another move-to-earn project has attracted much attention, and it is called Koinos. Essentially a blockchain platform for developing decentralized applications that incentivizes users to perform specific actions. An app developer could build a fitness app that uses cryptocurrency as an incentive for accomplishing some fitness goals. The creator of the Koinos designed this platform to be very flexible and scalable thus enabling many different move-to-earn applications. Move-to-earn projects represent a new fascinating direction in the cryptocurrency market, which may change the way we look at earnings.<sup>200</sup> By combining blockchain technology with physical activities, move-to-earn projects offer fresh possibilities for customers to gain cryptocurrency rewards while engaging in healthy living and regular exercises. As people become more interested in cryptocurrency, it is clear that move-to-earn projects will grow in popularity and increasingly become an essential part of the cryptocurrency ecosystem.



---

<sup>200</sup> Akash Kotalwar, *Decentralized Finance (DeFi): The Future of Financial Services*, BLOGSPOT, (March 14, 2023 05:11 AM, <https://akashkotalwar.blogspot.com/2023/03/decentralized-finance-defi-future-of.html>).





# Chapter 3

## Cryptocurrencies: Working Models, Pros, and Cons

*"Investing in Crypto is like being married, you have to keep going through the good and the bad, for better or for worse, for richer or for poorer TIL death do us part. HODL"*

— *Najah Roberts*<sup>201</sup>

### Synopsis

- 3.1 India's Banking Framework: A Traditional Perspective
- 3.2 Comparing Payment Systems: Cryptocurrencies vs Traditional Banking
- 3.3 Understanding Centralized (CEX) and Decentralized Exchanges (DEX) in Crypto Payments
- 3.4 CBDC (Central Bank Digital Currency): Introduction and Comparative Analysis

---

<sup>201</sup> Najah Roberts, Investing in Crypto is like being married, you have to keep going through the good and the bad, for better or for worse, for richer or for poorer TIL death do us part. HODL., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

## 3.1 India's Banking Framework: A Traditional Perspective

### 3.1.1 Traditional Banking Payment Model

India's traditional banking system encompasses banks which are regulated by Reserve Bank of India (RBI) – the country's central bank.<sup>202</sup> The system is fractional reserve based where banks keep only some fraction of their deposits in cash reserves and lend out the rest. Deposits in Indian banks are insured up to a specific amount by Deposit Insurance and Credit Guarantee Corporation (DICGC).<sup>203</sup> Public sector banks dominate the banking system in India with majority government shareholding. The traditional banking payment model in India consists of:

- **Cash transactions:** Cash dealings still exist in India, especially in rural zones. For minor purchases or payments for services and small deals are commonly made with cash.
- **Cheques:** Cheques are another well liked means of payment in India especially used for higher value transactions. They help to transfer money between bank accounts.
- **Demand Drafts:** Drafts however are alike to cheques but these are issued by banks and they bear a guarantee from the issuing bank. Most people use them when making payments to learning institutions or for paying their electricity bill amongst other things.
- **NEFT:** National Electronic Funds Transfer (NEFT) is an electronic funds transfer system used to move money electronically between bank accounts.<sup>204</sup> The NEFT system operates by processing transactions at set times during the day on a batch basis.

---

<sup>202</sup> XBRL, <https://www.xbrl.org/news/rbi-brings-non-bank-sector-into-alignment/> (last visited on March 15, 2023).

<sup>203</sup> ODISHATV.IN, <https://odishatv.in/news/technology/how-to-customize-your-fixed-deposit-to-earn-9-p-a-in-passive-income-198653> (last visited on March 15, 2023).

<sup>204</sup> ELEARNMARKETS, <https://www.elearnmarkets.com/school/units/100-faq-s-on-basic-finance/question-24> (last visited on March 15, 2023).

- **RTGS:** Real Time Gross Settlement (RTGS) differs from NEFT as it allows online transfer of funds even for very large amounts. It works on line-by-line settling of payments where the transaction is authorized and completed immediately after initiation.

### 3.1.2 Modern Banking Payment Model including CBDC

In India, the banking system has changed a lot in recent years due to technology.<sup>205</sup> The banking payment mechanisms that have come up with modernization have made it easy for people to transact and access financial services. In India, the following are part of modern banking payment model:

- **Mobile banking:** In India, mobile banking has gained much popularity, especially among young people. Bank programs allow their customers to check their balances, transfer funds, pay bills and carry out other transactions using their mobile devices.
- **Internet banking:** Internet banks are becoming famous day by day, especially among urban consumers in India.<sup>206</sup> These banks offer online banking options where customers can access accounts, transfer money to any person or firm through bill payments and undertake other transactions through their computers or other internet-enabled gadgets.<sup>207</sup> This is a real-time payment system that allows users to send money from one bank to another using just their smartphones. It operates all-round-the-clock and does not need account details as it only works on mobile phones, desktops, tablets, etc.<sup>208</sup>

---

<sup>205</sup> STODOCU, <https://www.studocu.com/en-us/messages/question/2851094/the-entertainment-industry-in-vietnam-has-undergone-significant-changes-in-recent-years-with-the> (last visited on March 15, 2023).

<sup>206</sup> UCL, <https://blogs.ucl.ac.uk/resilience/2013/08/21/what-resilience-means-to-my-generation/> (last visited on March 15, 2023).

<sup>207</sup> DATACHAMPS, <https://datachamps.ai/blog/report-on-payment-transactions-in-india/> (last visited on March 15, 2023).

<sup>208</sup> CLICKATELL, <https://www.clickatell.com/blog/safe-and-secure-whatsapp-payments/> (last visited on March 15, 2023).

- **Mobile wallets:** Mobile wallets are becoming increasingly popular in India, especially among young people. This is a way for users to load money on mobiles and make purchases at stores that accept mobile payments.
- **CBDC:** Central Bank Digital Currency (CBDC) refers to a digital form of fiat currency issued by the central bank.<sup>209</sup> RBI has recently launched and issued a digital version of Indian Rupee which would facilitate faster and more efficient transactions.<sup>210</sup>

To sum up, payment systems in India have changed significantly over time with modern payment methods like mobile banking, internet banking, UPI, mobile wallets and CBDC being introduced. However, traditional payment systems such as cash transactions, cheques and demand drafts still prevail albeit younger generation seem to prefer digital means of payment.

### 3.2 Comparing Payment Systems: Cryptocurrencies vs Traditional Banking

Cryptocurrencies operate differently from conventional banks while processing payments. Traditional banking systems involve a centralised institution, in which payments are processed through. A customer initiates a payment which is acknowledged by the bank, who debits the same amount from their account and credits it to the recipient's account. The bank keeps track of these transactions and charges fees for its services. This process of transaction is usually slow and may take a reasonably more time as it involves some intermediaries like correspondent banks or clearing houses. On the other hand, there are no intermediaries involved in cryptocurrency operations because they occur within a decentralised network. When an user sends currency to another user then it is disseminated to nodes

---

<sup>209</sup> Vishal Sharma A, Jaivignesh G, Suriyaa S, Raghul P, Anjali Jha M, Santhiya D, *A Study on the Level of Awareness of Digital Payments in India Among the Gen Z Population*, 9, IJIRMF 2023

<sup>210</sup> *Ibid.*

where it gets verified via complex algorithms.<sup>211</sup> Once verified, the transaction is entered onto blockchain ledger which is an open, secure and distributed record of all transactions made on a respective blockchain network.<sup>212</sup> Cryptocurrencies are known for speedy transactions that know no boundaries, often taking mere minutes while having relatively low fees when transacted as compared to the traditional banking systems.

The privacy and security of both methods of payments is another major distinguishing feature.<sup>213</sup> Unlike in traditional banking systems, where banks keep personal information like account numbers and transaction histories which may be hacked and result to identity theft.<sup>214</sup> On the other hand, cryptocurrencies are relatively private and secure as transactions are pseudonymous and secured by cryptography. In conclusion, though each payment system has its own pros and cons, cryptocurrencies offer a more decentralized, fast, and secure payment option compared to traditional banking systems.

### 3.3 Understanding Centralized (CEX) and Decentralized Exchanges (DEX) in Crypto Payments

There are many ways in which cryptocurrency payment models can be differentiated depending on the platform used for carrying out transactions. Some common examples include transaction through centralized exchanges or through decentralized exchanges. Centralized exchanges are managed by a central authority and serve

---

<sup>211</sup> TRADING AND DIGITAL CURRENCIES, <http://www.islamfortrading.com/2023/03/how-experts-predicted-that.html> (last visited on March 15, 2023).

<sup>212</sup> TRADING SIM, <https://www.tradingsim.com/day-trading/ethereum-proof-of-work-and-proof-of-stake-explained> (March 15, 2023).

<sup>213</sup> Rahul AR, *The Scope of Decentralizing Data Marketplaces Using Blockchain*, ACCUBITS BLOG (March 15, 2023), <https://blog.accubits.com/the-scope-of-decentralizing-data-marketplaces-using-blockchain/>.

<sup>214</sup> Dr. Vivek Pandey, *Promising Future of Blockchain Technology in Medtech Industry*, LINKEDIN (March 15, 2023), <https://www.linkedin.com/pulse/promising-future-blockchain-technology-medtech-industry-pandey/>.

as a go-between between cryptocurrency buyers and sellers.<sup>215</sup> When a user wishes to purchase or sell cryptocurrency, they transfer the funds to the exchange which matches them with a buyer or seller. After that, the exchange charges the fee for its services. Just like traditional bank systems, payment through centralized exchanges is based on reliance of a central authority to authenticate and validate transactions. On the other hand, decentralized exchanges exist within peer-to-peer (P2P) networks without having to depend on intermediaries.<sup>216</sup> Instead, smart contracts allow users to trade cryptocurrencies directly one another as they are self-executing agreements programmed in such a way that they enforce themselves.<sup>217</sup> This completely gets rid of any need for third parties thereby reducing possibilities of fraud or theft.<sup>218</sup> Nonetheless, decentralized exchanges are still in their infancy stages and not as easy to use as centralized ones.

Both payment methods require cryptocurrency wallets to enable sending and receiving of payments. Cryptocurrency wallets can be hot or cold, with each type having its own advantages and disadvantages. Hot wallets are more convenient for frequent transactions but are also more vulnerable to hacking, while cold wallets are more secure but less convenient. In essence, centralised exchanges have a typical way of making payments which is similar to traditional banking system whereas decentralised exchanges provide more secure, distributed alternative but may not be user friendly.

---

<sup>215</sup> FEED THE WHALE, <https://feedthewhale.com/> (last visited on March 15, 2023).

<sup>216</sup> Mayowa Olatunji, *Why Do You Need A Decentralized Exchange In 2023?*, MEDIUM (March 15, 2023), <https://medium.com/@olatunjimayowa0396/why-do-you-need-a-decentralized-exchange-in-2023-f3add8c80cbb>.

<sup>217</sup> ANTIER, <https://www.antiersolutions.com/crypto-token-development-a-comprehensive-guide-for-startups-in-2023/> (last visited on March 15, 2023).

<sup>218</sup> ONE37PM, <https://www.one37pm.com/nft/what-are-decentralized-exchange-platforms> (last visited on March 15, 2023).

### 3.3.1 The following are key explanations and insights with respect to Wallets in the Crypto Ecosystem:

- **Hot Wallets:**

Hot wallets are digital wallets that are continuously connected to the internet for carrying out regular transactions in cryptocurrencies.<sup>219</sup> These types of wallets are referred to as ‘hot’ because they stay connected online all the time, hence they have greater vulnerability towards hackers.<sup>220</sup> Some examples of hot wallets include mobile wallets, desktop ones as well as web-based ones among others.<sup>221</sup> Mobile wallet is an app that can be downloaded on smartphones so as it’s easy for use during transactional moment. Trust Wallet, Coinbase Wallet and Mycelium are some popular mobile wallet examples. Desktop wallets are programs that one can install on his/ her personal computer.<sup>222</sup> They don’t connect to the web all the time like mobile ones, so their level of security is a bit higher. Some well-known desktop wallets include Exodus, Atomic Wallet, and Electrum. Online wallets are those which can be accessed from any device with internet access. They are not as safe as desktop wallets but they are user friendly.<sup>223</sup> Examples of online wallets include MetaMask, MyEtherWallet, and blockchain.com.

- **Cold Wallets:**

A cold wallet is a physical device that holds cryptocurrencies offline and is non-internet connected.<sup>224</sup> Therefore, they provide more security than hot wallets as they have no chances of being

---

<sup>219</sup> BBN TIMES, <https://www.bbntimes.com/financial/16-important-crypto-definitions-and-glossary-explained-for-beginners> (last visited on March 15, 2023).

<sup>220</sup> CRYPTO ADVENTURE, <https://cryptoadventure.com/community/articles/short-series-what-are-hot-wallets/> (last visited on March 15, 2023).

<sup>221</sup> *Ibid.*

<sup>222</sup> DAPPFUNDERY, <https://www.dappfoundery.com/blogs/secure-web3-crypto-wallet> (last visited on March 15, 2023).

<sup>223</sup> BITCOIN WALLET, <https://bitcoinwallet-2.gitbook.io/us> (last visited on March 15, 2023).

<sup>224</sup> PHEMEX, <https://phemex.com/academy/cryptocurrency-glossary> (last visited on March 15, 2023).

hacked into.<sup>225</sup> Another term for cold-wallets is hardware-wallets.<sup>226</sup> Ledger Nano S, Trezor and KeepKey are examples of cold wallets used by most people.<sup>227</sup>

- **Paper Wallets:**

A paper wallet refers to a physical paper that carries the public and private keys corresponding to a cryptographic address. The highest level of security in cryptocurrencies is provided by the use of paper wallets since they do not require internet connectivity, hence they do not involve the great chances of the hacking vulnerabilities. However, unlike hot or cold wallets, these are inconvenient because they involve a manual process of transferring digital coins. To utilize them, print out your public and private keys on an actual sheet of paper and keep it in the safest place you can find.

- **Other Wallets:**

Besides hot, cold and paper wallets, there exist other forms of wallet with different features. For example, multi-signature wallets need more than one signature to authenticate a transaction thereby making them more secure. Custodial wallets are managed by another party which makes it convenient but could be risky if it gets hacked. Although brain wallets may store your private key in your memory, they should be avoided as they are susceptible to hacking and pilferage.

To conclude, the proper kind of wallet to choose largely depends on your needs and preferences.<sup>228</sup> Hot wallets are suitable for frequent transactions while cold wallets offer better security for long term

---

<sup>225</sup> STP NEWS, <https://news.safaritravelplus.com/cryptocurrency/best-cold-storage-wallets/> (last visited on March 15, 2023).

<sup>226</sup> KASPERSKY, <https://www.kaspersky.com/resource-center/definitions/what-is-cryptocurrency> (last visited on March 15, 2023).

<sup>227</sup> LEOFINANCE, <https://leofinance.io/@californiacrypto/different-ways-to-store-your-crypto-explained> (last visited on March 15, 2023).

<sup>228</sup> BREET, <https://blog.breet.app/types-of-bitcoin-wallets> (last visited on March 13, 2023).

storage.<sup>229</sup> Paper wallets are the most secure but are not as convenient as hot or cold wallets. Other types of wallets have different features that may be excellent in particular use cases.

### 3.4 CBDC (Central Bank Digital Currency): Introduction and Comparative Analysis

Central Bank Digital Currency (CBDC) represents a type of central bank issued and backed digital fiat currency. It was designed as an electronic equivalent of cash allowing for instant secure transaction without intermediaries. Many governments and central banks all over the world are now showing interest in CBDCs with several countries examining their potential pros and cons. China is also among the countries that are leading in CBDC development, with the digital currency electronic payment (DCEP) project having been in progress since 2014. Various test schemes were introduced in several big cities. The DCEP is expected by People's Bank of China (PBC) to take over from physical cash and it can be operated offline because it is centralized by the Chinese government. The cohesion of this project would improve China's monetary policy as well as financial system.

The European Central Bank (ECB) has also been considering introducing a digital Euro.<sup>230</sup> According to the ECB, this will not replace cash but rather complement it, and also accessible to all citizens. In fact, ECB had citizen consultations where they called for stakeholders' opinions if they should adopt a distributed ledger technology based issuance or not. The United States Federal Reserve has sought to explore various advantages and disadvantages tied around implementing CBDCs within its jurisdiction which could

---

<sup>229</sup> RIVER FINANCIAL, <https://river.com/learn/bitcoin-wallets> (last visited on March 13, 2023).

<sup>230</sup> Turner Wright, *ECB Official Suggests Importance of Physical Stores Accepting Digital Euro*, COINTELEGRAPH (March 15, 2023), <https://cointelegraph.com/news/ecb-official-suggests-importance-of-physical-stores-accepting-digital-euro>.

include enhancing inclusion levels across multiple banking services.<sup>231</sup> This was clearly put forward during a report explaining how a CBDC may boost inclusiveness and reduce transaction costs as stated in that document . However, in line with research into these issues, CBDCs have shown potential weaknesses that need further exploration before issuing any digital dollar, for instance it might threaten stability of finance, hence it requires more investigations on the possible actions to be undertaken regarding whether developing such an initiative would be advisable or not.

E-Krona, which is being considered by the Central Bank of Sweden, is expected to upgrade the effectiveness and security of the payment system in Sweden. It will be a substitute for physical money and available for everyone. Still the Central Bank of Sweden has said that it is at a research stage and development on e-Krona may take place in future.

Other countries such as Japan, South Korea and Canada are also examining CBDCs. The Bank of Japan is experimenting with digital yen while the bank of Korea examines the advantages and risks associated with CBDCs. The Bank of Canada is trying to find out what positive or negative impacts would come from CBDC saying they will only issue their own digital currency if need arises. In summary, central banks around the world are now putting more emphasis on CBDCs which many other countries are investigating its benefits or consequences. Although there are different ways to develop CBDCs in each particular country, opinion is unanimous among them that having digital currency alongside cash money would serve well.

---

<sup>231</sup> Sarang Pokhare, The Rise of CBDCs: How Digital Currencies Could Revolutionize Finance, LINKEDIN (March 15, 2023), <https://www.linkedin.com/pulse/rise-cbdc-how-digital-currencies-could-revolutionize-sarang/>.

### 3.4.1 CBDC : India's Approach

Central Bank Digital Currency (CBDC) refers to an electronic form of fiat currency for a country.<sup>232</sup> This is published and handled by the central bank of the country.<sup>233</sup> The Reserve Bank of India (RBI) has already launched this type of digital currency for India by the name of E-Rupee. The aim behind instituting CBDC is to make online transactions more secure, faster and easier. Over the last few years, there has been a significant increase in the use of e-payments in India. This has partly been facilitated by government's move towards cashless economy and increased penetration of smart phones and growth experienced in platforms like Paytm and PhonePe. However, digital transactions still face challenges such as high transaction fees, long processing times, and risk of fraud.<sup>234</sup> To overcome these obstacles, a CBDC offers secure payments that are nearly costless and are made instantaneously. Moreover, it holds the potential to enable the government to have better control over money flow. Thus, fighting with money laundering among other financial crimes will be quite effective. Nevertheless, introducing a CBDC involves many complexities that depend on various factors. The leading obstacle to the introduction of a CBDC in India is its large and diverse population. India has over 1.3 billion people, and unfortunately, a substantial part of the population remains unbanked. The RBI will have to make sure that every segment of the public, including those living in rural or remote areas, can easily access and use a CBDC.

The safety and steadiness of the CBDC are also important challenges. Recently, India had some high-profile cyber attacks. Hence, the protection against any such attack on its digital currency

---

<sup>232</sup> SILICONANGLE, <https://siliconangle.com/2022/10/14/bitcoin-community-casts-wary-eye-government-regulation-central-banks/> (last visited on March 15, 2023).

<sup>233</sup> INDIABLOOMS, <https://www.indiablooms.com/finance-details/15640/rbi-working-on-phased-implementation-of-digital-currency-minister.html> (last visited on March 15, 2023).

<sup>234</sup> CRYPTOWEEKLY, [https://cryptoweekly.co/crypto-blog/Ethereum%20Classic%20Popular%20Use%20Cases%20For%20Entertainment\\_t\\_263?page=19](https://cryptoweekly.co/crypto-blog/Ethereum%20Classic%20Popular%20Use%20Cases%20For%20Entertainment_t_263?page=19) (last visited on March 15, 2023).

- CBDC needs to be taken care off. In addition, RBI must emphasize on developing a system that does not fail technically or collapse under high transaction volumes. RBI should decide if users' transactions with CBDC will be anonymous or not. Many countries have already advanced in the development of their CBDCs.<sup>235</sup> India & China iare currently at the forefront, with several cities testing its CBDC by virtue of the pilot projects in association with their various banks. Moreover, other nations such as the United States, Canada and United Kingdom are also considering a CBDC.

To sum up, CBDC's introduction in India, might change the existing payment system for good in the longer run. This can offer an inexpensive secure and real-time mode of payment in addition to aiding in combating financial crimes. Nevertheless, RBI needs to take into account some considerations like accessibilities, securities and technical designs among others before issuing a CBDC in India.

## Advantages and Challenges of Cryptocurrencies

### Pros of Cryptocurrencies:

Besides being relatively new types of money supply, cryptocurrencies have various advantages. Here are some of the pros of cryptocurrencies:

- **Decentralization:** Cryptocurrencies are decentralized, meaning that no government or financial institution controls them.<sup>236</sup> Consequently, this provides users with complete authority over their funds without requiring intermediaries which makes them less susceptible to influence or deceitfulness.
- **Security:** Transactions are safeguarded by cryptocurrencies through the application of advanced algorithms for

---

<sup>235</sup> INVESTING.COM, <https://www.investing.com/news/cryptocurrency-news/new-ukrainian-law-to-treat-cbdc-as-cash-2549067> (last visited on March 15, 2023).

<sup>236</sup> Vremarioiu Alin, *What Are The Advantages of Cryptocurrency?*, MEDIUM (March 15, 2023), <https://medium.com/coinmonks/what-are-the-advantages-of-cryptocurrency-886819a3ce58>.

cryptology, thus eliminating any chances of fraud.<sup>237</sup> This is achieved through a method using public and private keys to ensure that a cryptocurrency's owner alone can access it and all transactions on an unchangeable blockchain ledger, which is almost impossible to break into.

- **Anonymity:** Even though each transaction is stored permanently on the blockchain, there is no link between users' personal information and their activities.<sup>238</sup> Consequently, this anonymity provides more privacy and it safeguards them from identification theft cases.
- **Lower transaction fees:** Conventional banking systems mainly impose high charges on most transactions, especially in cross-border money transfers. Conversely, generally cryptocurrencies have very low transaction costs and they are also quicker in most cases making them a better alternative.
- **Accessibility:** Cryptocurrencies are available to everyone with an internet connection, thereby enabling individuals who do not have access to traditional financial systems to use them. They are also open to people without official identification like refugees or the unbanked as well.
- **Transparency:** These blockchain operates where different parties can be able to see every operation taking place, hence promoting accountability.<sup>239</sup> This helps in avoiding fraudulent acts as well as creating a more inclusive and credible financial sector.
- **Potential for high returns:** Early investors in some digital currencies have seen their value increasing significantly.<sup>240</sup> While this is not an assurance, the possibility of high returns

---

<sup>237</sup> TER, <https://techerreport.com/ultimate-guide-to-cryptocurrency> (last visited on March 15, 2023).

<sup>238</sup> COINTOKENBIT, <https://www.infotoken.site/2023/03/the-future-of-money-top-10.html> (last visited on March 15, 2023).

<sup>239</sup> GLOBAL INSIGHTS PARTNER, <https://www.globalinsightspartner.com/blog/blockchain-technology-overview-and-opportunities> (last visited on March 15, 2023).

<sup>240</sup> METAVERSEPOST, <https://mpost.io/top-crypto-tokens-to-invest/> (last visited on March 15, 2023).

has attracted many to cryptocurrencies as an investment option.

### Cons of Cryptocurrencies:

Some cons or possible drawbacks of the cryptocurrencies includes:

- **Volatility:** The worth of cryptocurrencies is highly unpredictable, hence it makes them extremely dangerous and may also result in significant losses.
- **Lack of regulation:** Cryptocurrencies are neither regulated by governments nor financial institutions, therefore they can be easily defrauded with, scammed or manipulated by market.<sup>241</sup>
- **Limited acceptance:** They haven't been accepted for widespread usage yet, thus reducing their usefulness and practicability for day-to-day transactions.<sup>242</sup>
- **Security risks:** Although cryptocurrencies are mostly safe to use, they still pose a threat concerning hacking attacks, phishing activities among others related security breaches.
- **Irreversible transactions:** It is an issue, when there is a mistake or funds are sent to the wrong account and it is not possible to cancel a blockchain-confirmed cryptocurrency transaction.
- **Environmental impact:** A number of cryptocurrencies, especially those that use proof-of-work consensus mechanism, require considerable energy before they can function and this has negative implications on the environment.

---

<sup>241</sup> TRADE REVENUE PRO, <https://traderevenuepro.com/explore-the-key-advantages-and-disadvantages-of-investing-in-cryptocurrency/trade-article/> (last visited on March 15, 2023).

<sup>242</sup> DBINVESTING, <https://dbinvesting.com/blog/crypto-vs-traditional-finance/> (last visited on March 15, 2023).

- **Complexity:** Cryptocurrencies are so complex for many people. So those who are not well versed in technology makes them inefficacious and less reachable for everyday use.







# Chapter 4

## Cryptocurrencies : Shaping Market Trends and Sentiments

*"If crypto succeeds, it's not because it empowers better people. It's because it empowers better institutions."*

— **Vitalik Buterin**<sup>243</sup>

### Synopsis

- 4.1 An Overview of the Market Dynamics

### 4.1 An Overview of the Market Dynamics

Several factors can affect the crypto market as cryptocurrencies gain more popularity and become widely accepted. These factors play a great role in determining the worth of various digital coins as well as their implications to traders and investors. Government regulations are also one of the most significant factors that can shape the cryptocurrency market. Cryptocurrencies are a regulatory puzzle that governments across the world at large have not yet been able to solve.

---

<sup>243</sup> Vitalik Buterin, If crypto succeeds, it's not because it empowers better people. It's because it empowers better institutions., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

Some countries have banned cryptocurrencies entirely while others have embraced them more openly.<sup>244</sup> Changes in regulation, such as new laws or restrictions, can impact the crypto market significantly and result in price swings for various digital coins. Another factor is utilization levels and acceptance of cryptocurrency by people. With time, if more merchants and businesses begin accepting cryptos as a mode of payment then their demand may rise, thus pushing up their prices.<sup>245</sup> Alternatively, introduction of unique blockchain-backed applications, platforms or systems can also escalate interest in specific cryptocurrencies.

Another factor that determines its value is community sentiment towards cryptocurrencies. News stories with a positive view of it or endorsements from influential personalities make investors feel bullish, while negative news stories like hacking incidents make them bearish. Also, when one talks about the value of cryptocurrencies then market supply and demand cannot be left out. If the competitive cryptocurrency has less supply but a high demand, then its value will increase. Otherwise, if there is more supply than people you wishes to acquire them then it means that their prices will go down and such a view is based on practical economics principles. Last but not the least, in this case are the technological advancements and developments on the blockchain space which also influence the crypto market. Whenever new quicker and more efficient blockchain technologies are being developed then their adoption is possible to drive up cryptocurrency use, thereby increasing their values. In conclusion, it is necessary to note that crypto market operates under conditions of dynamism and complexity with many factors affecting it. Among these factors, some of the prominent ones are government regulations, adoption and use, as well as market sentiment dynamics, supply and demand, technological advances etc., majorly all these constitutes to be the reasons that may affect the worth of

---

<sup>244</sup> Chloe Orji, *Bitcoin ban: These are the countries where crypto is restricted or illegal*, EURONEWS.NEXT (Aug. 25, 2022), <https://www.euronews.com/next/2022/08/25/bitcoin-ban-these-are-the-countries-where-crypto-is-restricted-or-illegal2>.

<sup>245</sup> Pymnts, *85% of Big Retailers Accept Cryptocurrency as a Form of Payment*, PYMNTS (Jun. 24, 2022), <https://www.pymnts.com/metaverse/2023/how-facebook-turned-the-metaverse-into-a-buzzword/>.

cryptocurrencies. By considering such aspects alongside, investors can make wise choices in the crypto market.<sup>246</sup>

#### 4.1.1 Key Drivers of the Crypto Market: Decoding the Influencing Factors

##### 1. Prevailing Trends

In cryptocurrency, trends contribute a lot to what happens on the exchange. It is important to note here that these trends do not necessarily reflect the fundamentals of a particular cryptocurrency but rather they are driven by hypes and speculations. Media coverage, celebrity endorsements, social media buzz or community support can all be the pivotal sources of trend which may be further divided into several ones. The biggest trend in the crypto market so far has been the trend of meme coins. Meme coins are cryptocurrencies without any real use cases but are popular because they go viral and relate to the subject matter of memes.<sup>247</sup> Dogecoin is the best-known example of such a coin as it was widely adopted after receiving encouragement from notable people like Elon Musk and Mark Cuban, who tends to be very influential. There was another trend that arose in the cryptocurrency market and that was the rise of decentralized exchange (DEX) tokens. DEXs are digital currency exchanges that work on a decentralized blockchain network, thus allowing users to trade cryptocurrencies without needing a central authority.<sup>248</sup> As investors realized the potential for decentralized finance (DeFi) protocols that are designed for financial services provision without intermediaries, therefore the investors embraced DEX tokens comprehensively.

---

<sup>246</sup> Forex Academy, *What really moves the forex market?*, FOREX.ACADEMY (Mar. 8, 2023), <https://www.forex.academy/what-really-moves-the-forex-market/>.

<sup>247</sup> Dan Ashmore & Farran Powell, *What Are Meme Coins? Are They Worth Investing In?*, FORBES (July 4, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-are-meme-coins-are-they-worth-investing-in/>.

<sup>248</sup> Tatiana Koffman, *The Rise Of Decentralized Exchanges On Polkadot*, FORBES (Apr. 27, 2021), <https://www.forbes.com/sites/tatianakoffman/2021/04/27/the-rise-of-decentralized-exchanges-on-polkadot/?sh=4de4682e8169>.

Another trend that emerged in the cryptocurrency market over time is the play-to-earn tokens.<sup>249</sup> Play-to-earn tokens are cryptocurrencies that allow gamers to earn rewards or tokens by playing games. Given that blockchain technology made it possible for developers to create decentralized gaming platforms where participants could be rewarded with cryptocurrencies as incentives. Also significant in the cryptocurrency market were the metaverse tokens. Metaverse tokens are cryptocurrencies that are required to access virtual worlds or metaverses, where one can do things like playing games, socialising and trading their products. The surge of metaverse tokens resulted from growing interest in virtual reality and blockchain's potential in developing decentralised virtual worlds. Generally, it is important to realize that trends in crypto can change fast and are usually temporary, since new trends keep emerging. It is therefore necessary to undertake a thorough research or analysis before investing in a trend-driven cryptocurrency as often they may not have a strong underlying use case or value proposition.

## 2. FOMO (Fear of Missing Out)

The factors behind the cryptocurrency market are made up of hype and fear of missing out (FOMO).<sup>250</sup> People invest heavily in cryptocurrencies because they anticipate and get excited over their huge anticipated returns. The emergence of Bitcoin in 2017 which recorded an astronomical growth fuelled by hype and FOMO lured many novice traders into the market. Previously, there have been cases where the price of some specific cryptocurrencies has risen significantly due to the hype and FOMO surrounding them. Nonetheless, when such surges in prices occur, these same coins tend to suddenly lose much value after the frenzy subsides. The Initial Coin Offering (ICO) craze of 2017 was one of the first known

---

<sup>249</sup> Robert Farrington, *Play-To-Earn Gaming Is Driving NFT And Crypto Growth*, FORBES (Dec. 13, 2021),

<https://www.forbes.com/sites/robertfarrington/2021/12/13/play-to-earn-gaming-is-driving-nft-and-crypto-growth/?sh=43c5da34c2dc>.

<sup>250</sup> Tobi Opeyemi Amure, *How to Deal With Crypto FOMO*, INVESTOPEDIA, <https://www.investopedia.com/deal-with-crypto-fomo-6455103> (last updated Feb. 28, 2023).

examples of hype and FOMO in the world of cryptocurrencies. A good number of projects raised millions by selling their tokens with promises to change industries.<sup>251</sup> Many turned out being scams or underperformed leading to heavy losses for investors. This began in 2021, with Dogecoin going nuts. Elon Musk's tweets about the altcoin have made it go viral as a joke-currency. Consequently, the excitement and fear surrounding Dogecoin spurred an astronomical rise in its price, with some asserting that it could hit \$1 mark. Nonetheless, prices fell eventually after a peak driven by hype leaving those who bought at highs counting huge losses.

The NFT (Non-Fungible Token) market too has been experiencing a great deal of hype and FOMO for the past few years. NFTs are digital assets that represent ownership of one-of-a-kind items like art, music, and video games. In the first quarter of 2021, the NFT market exploded with some digital arts selling at millions of dollars.<sup>252</sup> Additionally, many new projects were created out of the FOMO and hype about NFTs which promised to transform it but could not fulfil the introductory promises. It is worth noting that both hype and FOMO can have negative as well as positive effects on cryptocurrencies. On one hand, they support the growth in value of certain cryptocurrencies and on another hand, however, they may foster a bubble that ultimately bursts thereby causing significant financial losses to investors. Therefore, it is vital to conduct thorough research and be cautious before investing into any form of cryptocurrency.

### 3. Celebrity's Influence

The impact of celebrities on the cryptocurrency market is significant, and their approval alone can lead to a dramatic rise in the value of digital currencies. Some famous persons have publicly announced their engagement with cryptos through investing or

---

<sup>251</sup> Oscar Williams-Grut, *People are raising hundreds of millions selling digital coins online — it's either the future of funding or a 'bubble'*, INSIDER (July 8, 2017, 1:05 PM), <https://www.insider.com/initial-coin-offerings-explained-icos-token-crowdsale-2017-7>.

<sup>252</sup> Stephen Graves et al., *The 15 Most Expensive NFTs Ever Sold*, DECRYPT (Feb. 21, 2022), <https://decrypt.co/62898/most-expensive-nfts-ever-sold>.

launching their own virtual monies. This has encouraged more interest from the fanatics and contributed to its overall growth. Nevertheless, such involvement may also prove detrimental as it encourages scams or pump and dump schemes. One celebrity who has been involved with crypto is Elon Musk, the CEO of Tesla and SpaceX. Musk has a history of tweeting about cryptocurrencies and his tweets often cause huge price swings. For example, in May 2021 Musk posted on Twitter that Tesla will no longer accept Bitcoin for its cars, due to the environmental concerns that the Bitcoin raises. This tweet caused Bitcoin's price to fall by more than 10%, wiping off an estimated \$365 billion from its market capitalization.<sup>253</sup> In a similar vein, when he first tweeted about Dogecoin early this year, the prices skyrocketed by over 500% following his remarks.<sup>254</sup>

Celebrities engage in various activities that have a bearing on the unpredictable world of crypto currencies. There is also another celebrity who was involved, Floyd Mayweather, a retired boxer. He has been promoting several ICOs (Initial Coin Offerings) and later charged for running fraud by SEC (Securities and Exchange Commission).<sup>255</sup> In 2018 he had to pay a fine of \$614,775 because he did not disclose that he was paid to promote three different ICOs.<sup>256</sup> Moreover, Paris Hilton is viewed as one of the people who encourage cryptocurrency use. Paris tweeted in relation to an Initial Coin Offering or also called ICO by LydianCoin which planned to build up a blockchain for online advertising. However, it was later surfaced that the said ICO was a scam and founders were sued by SEC for

---

<sup>253</sup> Arjun Kharpal, *As much as \$365 billion wiped off cryptocurrency market after Tesla stops car purchases with bitcoin*, NBC NEWS (May 13, 2021, 6:46 PM), <https://www.nbcnews.com/tech/tech-news/365-billion-wiped-cryptocurrency-market-musks-tweet-rcna922>.

<sup>254</sup> Ante, L. (2023) "How Elon Musk's Twitter activity moves cryptocurrency markets" *Technological Forecasting and Social Change*, 186, p. 122112. Available at: <https://doi.org/10.1016/j.techfore.2022.122112>.

<sup>255</sup> Ahiza Garcia, *DJ Khaled, Floyd Mayweather Jr. charged with promoting cryptocurrency without disclosing they were paid*, CNN BUSINESS (Nov. 30, 2018), <https://edition.cnn.com/2018/11/29/tech/dj-khaled-floyd-mayweather-coin-crypto-sec/index.html>.

<sup>256</sup> Joseph Young, *SEC May Start Going After Crypto ICO Promoters Who Failed to Disclose Compensation*, U.TODAY (Dec. 1, 2023, 2:29 PM), <https://u.today/sec-may-start-going-after-crypto-ico-promoters-who-failed-to-disclose-compensation>.

misappropriation of investor's funds. The participation of different celebrities in digital money may attract more attention and capital into this market. Nonetheless, it is important to ascertain all the facts and one must be careful before investing his or her money, since some famous endorsements can also give rise to scams or pump-and-dump schemes. It is crucial to invest the hard earned money based on the fundamentals of the cryptocurrency rather than solely relying on celebrity endorsements.

#### 4.1.2 Various cryptocurrencies influenced by Elon Musk, are as follows:

Elon Musk, the CEO of Tesla and SpaceX, is arguably known to use his tweets and public comments to move and influence the cryptocurrency market. Musk has tweeted about a number of different cryptos in the past, leading to a considerable increase or decrease of their prices. Some of the affected cryptocurrencies by Elon Musk are as follows:

- **Dogecoin (DOGE)**

This is a meme-based cryptocurrency which was made just for laughs.<sup>257</sup> Dogecoin has found favour and recognition from Elon Musk, who has tweeted about it more than once.<sup>258</sup> On February 2021, "Dogecoin is the people's crypto," tweeted Musk, and DOGE shot up by over 50%.<sup>259</sup> Although his tweets kept pumping up the price of DOGE

---

<sup>257</sup> Dogecoin, *What is Dogecoin?*, DOGECOIN, <https://dogecoin.com/dogepedia/articles/what-is-dogecoin/> (last visited Mar. 27, 2023).

<sup>258</sup> Grace Kay, *The history of Dogecoin, the cryptocurrency that surged after Elon Musk tweeted about it but started as a joke on Reddit years ago*, BUSINESS INSIDER INDIA (Feb. 9, 2021, 9:51 PM), <https://www.businessinsider.in/stock-market/news/the-history-of-dogecoin-a-cryptocurrency-that-started-as-a-joke-on-reddit-years-ago-and-recently-surged-600-in-a-wall-street-bets-copycat-rally/articleshow/80592974.cms>.

<sup>259</sup> Jasper Jolly, *Price of dogecoin rises by 50% following Elon Musk tweet*, THE GUARDIAN (Feb. 4, 2021, 11:33 AM), <https://www.theguardian.com/business/2021/feb/04/price-of-dogecoin-rises-by-50-following-elon-musk-tweet>.

but after featuring on Saturday Night Live (SNL) Show, where he termed it as a “hustle” and Dogecoin ended up plunging.

- **Bitcoin (BTC)**

Bitcoin is the largest cryptocurrency by market capitalization. Consequently, in May 2021 Musk tweeted that his company would stop accepting Bitcoin as payment, due to concerns about its effect on the environment.<sup>260</sup> It was a single day when the price of Bitcoin fell more than 10%. Tesla CEO motivated this coin’s concomitant volatility by consistently tweeting about it but never brought it back to its former popularity.

- **Ethereum (ETH)**

ETH is the second most valuable digital currency by the market capitalisation. Subsequently, in July 2021, he posted something through Twitter and this prompted Ethereum’s value to grow by more than ten percent. Thereafter Musk announced: “I own some ETH too.” This definitely made its cost increased dramatically once again.

- **Shiba Inu (SHIB)**

Shiba Inu is a new dog-themed meme coin designed to rival the Dogecoin. After May of 2021, Shiba Inu’s price rose by over twenty percent following a cryptic tweet from Musk about it. Moreover, SHIB’s value went up further because Elon continued to post cryptic tweets concerning it. However, just like any other crypto-shitcoin, Shiba started going down!

---

<sup>260</sup> Rani Molla, *When Elon Musk tweets, crypto prices move*, VOX (Jun. 14, 2021, 11:00 AM), <https://www.vox.com/recode/2021/5/18/22441831/elon-musk-bitcoin-dogecoin-crypto-prices-tesla>.

- **Baby Doge Coin (BABYDOGE)**

Baby Doge Coin is a cryptocurrency that was created as a spinoff of Dogecoin. In July 2021, Baby Doge Coin was tweeted by Musk because of which its price surged by more than 100%. Furthermore, Musk went ahead tweeting about the BABYDOGE. Nevertheless, as with other cryptocurrencies, this led to the price of BABYDOGE settling down eventually.

In conclusion, Elon Musk's influence on cryptocurrency market cannot be undermined and his tweets and public statements have caused significant fluctuations in prices for different cryptocurrencies. But investors ought to be cautious about relying solely on his tweets since this is highly volatile and unpredictable.

#### **4.1.3 Some Cryptocurrencies influenced by Snoop Dogg are:**

Another celebrity involved in the world of cryptocurrencies is Snoop Dogg, a famous rapper and businessperson who has tweeted on several digital currencies like Elon Musk leading to changes in their prices. In 2013, Snoop Dogg used Twitter to announce that he was partnering with a Kanye West inspired cryptocurrency called Coinye West.<sup>261</sup> Consequently, however, the coin creators were slapped with “cease and desist” letter from Kanye West attorneys forcing them to shut down Coinye West. During the Consensus blockchain conference in New York in 2018, Snoop Dogg participated in an XRP Community Night.<sup>262</sup> Consequently, this created speculation that Snoop Dogg had endorsed XRP, causing its price to soar. In 2020, Snoop Dogg was named as a keynote speaker for the Blockchain World Conference 2020 in Las Vegas. However, the conference was subsequently postponed due to the COVID-19

---

<sup>261</sup> Sean Michaels, *Kanye West inspired Bitcoin alternative to launch next month*, THE GUARDIAN (Jan. 3, 2014, 11:06 AM), <https://www.theguardian.com/music/2014/jan/03/kanye-coinye-west-bitcoin-coinye-cryptocurrency>.

<sup>262</sup> Felix Mollen, *Snoop Dogg Joins Crypto Casino as Chief Ganjaroo Officer*, CRYPTOPOTATO (Mar. 6, 2023), <https://cryptopotato.com/snoop-dogg-crypto-casino-roobet-chief-ganjaroo-officer/>.

pandemic. He has also been promoting another cryptocurrency known as "Dogecoin" on his social media accounts. He tweeted a picture of a Shiba Inu dog, which is the mascot for Dogecoin and with "Snoop Doge" as the caption. This tweet led to a temporary jump in Dogecoin's price.

In May 2021, there was a tweet by Snoop Dogg featuring a dog wearing a necklace made of diamond and has Bitcoin logo pendant on it. Further he Tweeted that "It's official I'm part of the #cryptocurrency #blockchain you can buy Snoop Dogg #coins on @eToro now." This aroused guesses that Snoop was endorsing Bitcoin and eToro (a cryptocurrency trading platform). It is not clear that if he actually partnered with eToro or not though. Nevertheless, Snoop Dogg has had a relatively modest role in the cryptocurrency market compared to other celebrities such as Elon Musk, but his cryptic tweets and endorsements have still been influential on some cryptocurrencies.

### **These are some of the many digital currencies that Mark Cuban has influenced:**

Mark Cuban, a billionaire entrepreneur and owner of the Dallas Mavericks basketball team, is another person who has an influence on the crypto market through his opinions and actions. Here's an in-depth analysis of different cryptocurrencies pumped and dumped by Mark.

- **Dogecoin (DOGE)**

Dogecoin is one of those major cryptocurrencies that Mark Cuban has often mentioned. In 2019 he tweeted that he owned some DOGE but considered it not for being taken seriously as an investment. But beginning from early 2021, he started tweeting even more about Dogecoin with the Dallas Mavericks accepting DOGE for payment of

merchandise only.<sup>263</sup> Consequently, its price rose and dramatically reached the historical maximum of \$0.69 in May 2021. However, later on it turned out that the Mavericks were not holding any DOGE and urged investors to be cautious while investing in this currency.

- **Unikoin Gold (UKG)**

UnikoinGold is a cryptocurrency developed by Unikrn, a blockchain-based gaming platform. In 2017, Cuban invested in Unikrn, and the company later launched UnikoinGold as a cryptocurrency for online gaming.<sup>264</sup> In 2018, Cuban tweeted about UKG, stating that it had potential as a cryptocurrency for esports and online gaming. This led to a surge in the price of UKG, but it later dropped when the company faced legal issues with the US Securities and Exchange Commission.

- **Basic Attention Token (BAT)**

Basic Attention Token (BAT) is a cryptocurrency that is used in the Brave browser, a privacy-focused browser that blocks ads and trackers.<sup>265</sup> In 2017, Cuban participated in BAT's initial coin offering (ICO) and tweeted about the cryptocurrency's potential. BAT's price surged after Cuban's tweets, but it later dropped when the cryptocurrency market experienced a downturn.

- **Polygon (MATIC)**

---

<sup>263</sup> Taylor Locke, *Mark Cuban says dogecoin is the 'strongest' cryptocurrency as a medium of exchange*, CNBC (Aug. 13, 2021, 3:48 PM), <https://www.cnbc.com/2021/08/13/mark-cuban-dogecoin-is-the-strongest-crypto-as-a-medium-of-exchange.html>.

<sup>264</sup> Taylor Soper, *Ethereum co-founder and Mark Cuban put \$25M toward Unikrn esports betting platform's digital token sale*, CNBC (Sept. 25, 2017, 9:27 PM), <https://www.cnbc.com/2017/09/25/ethereum-co-founder-and-mark-cuban-put-25m-toward-unikrn-esports-betting-platforms-digital-token-sale.html>.

<sup>265</sup> Coinbase, *Basic Attention Token*, Coinbase, <https://basicattentiontoken.org/> (last visited Mar. 27, 2023).

Polygon (MATIC), formerly known as Matic Network, is a Layer 2 scaling solution for Ethereum.<sup>266</sup> In June 2021, Cuban revealed that he had invested in MATIC, stating that he believed it had potential as a Layer 2 solution for Ethereum. This led to a surge in the price of MATIC, but it later dropped when the cryptocurrency market experienced a downturn.

- **Ethereum (ETH)**

Cuban is an Ethereum (ETH) advocate, who has invested in different projects based on the Ethereum network. In May 2021, Cuban noted that he was enthusiastic about the Layer 2 solutions of Ethereum as well as Polygon (MATIC) and Optimism as how they could solve scaling problems on Ethereum. It is quite possible that Cuban's positive remarks about Ethereum have played a role in making this cryptocurrency popular and valuable.

To sum up, Mark Cuban's words and deeds have had repercussions on the market for cryptocurrencies, particularly those of Dogecoin and UnikoinGold. However, before investing in response to such opinions from well-known individuals or influencers, one must be careful since his tweets and investments can also trigger price hikes for some coins.

#### 4. Partnerships

The partnerships among various cryptocurrency projects with other companies or firms constitutes to be another factor contributing to volatility in crypto markets. Some of these collaborations are expected to increase the acceptance of digital money, thus creating more trust among investors. One example of a successful partnership is the collaboration between cryptocurrency exchange Coinbase and payment processor PayPal. In 2020, the two companies announced a partnership that allowed Coinbase users to buy and sell

---

<sup>266</sup> Alex Moskov, *What is Polygon (MATIC)? A Guide on the Ethereum Layer Two Solution*, COINCENTRAL (Nov. 5, 2022), <https://coincentral.com/what-is-polygon-matic-a-guide-on-the-ethereum-layer-two-solution/>.

cryptocurrencies using their PayPal accounts.<sup>267</sup> The move was seen as a significant step towards mainstream adoption of cryptocurrencies. Another example is the partnership between cryptocurrency project VeChain and PwC, a multinational professional services network.<sup>268</sup> VeChain's blockchain technology is being used by PwC to verify the authenticity of certain products, such as luxury goods and food items, by tracking them throughout the supply chain. This partnership has helped increase trust in the VeChain project and its technology.

On the other hand, failed partnerships can have a negative impact on the market. In 2018, cryptocurrency project Ripple announced a partnership with payment processing company MoneyGram, which was expected to increase the usage of Ripple's XRP token. However, the partnership did not achieve the desired results, and MoneyGram announced that it has suspending the use of Ripple's platform due to regulatory uncertainty.<sup>269</sup> Partnerships may also bring about speculation and hype and that can lead to temporary price spikes followed by drops. Tron, a cryptocurrency startup announced its partnership with Samsung in 2019, which was thought of as a big step towards normal adoption of cryptocurrencies. The announcement resulted in a rise in the price of Tron and that was followed by a sharp fall. In general, partnerships are an important element to the success or failure of cryptocurrencies. They can increase the adoption and usage as well as the investor's confidence. Nevertheless, the investors shall be careful about the sorts of speculation and hyperbole that often accompany them.

---

<sup>267</sup> PayPal, *PayPal Launches New Service Enabling Users to Buy, Hold and Sell Cryptocurrency*, PAYPAL NEWSROOM (Oct. 21, 2020), <https://newsroom.paypal-corp.com/2020-10-21-PayPal-Launches-New-Service-Enabling-Users-to-Buy-Hold-and-Sell-Cryptocurrency>.

<sup>268</sup> VeChain, *VeChain partners with PwC to boost Blockchain technology utility in Asia*, VECHAIN INSIDER (May 22, 2017), <https://vechaininsider.com/partnerships/vechain-partners-with-pwc-to-boost-blockchain-technology-utility-in-asia/>.

<sup>269</sup> Reuters Staff, *Blockchain firm Ripple to end partnership with MoneyGram*, REUTERS, <https://www.reuters.com/article/us-ripple-moneygram-intl-idUSKBN2B02KO> (last updated Mar. 9, 2021, 4:05 AM).

## 5. Ambassadorships

Ambassadorships also play a role in manipulating crypto markets. Ambassadorships refers to where companies or projects hire well-known people to represent their interests and popularize their products.<sup>270</sup> These envoys might include celebrities, sportsmen & sportswomen, industry moguls or influential personalities within communities. The purpose of having ambassadors is to use their name, recognition and influence for the purposes of accessing wider audience, while at the same time increasing visibility and trustworthiness for both projects or firms involved by means of social media messages, events & other promotional activities.

Various projects within the crypto industry have used ambassadorships as a way to enhance their profiles and gain more recognition. For example, the BitClout, which is a social media platform based on blockchain announced that it had appointed Anthony Scaramucci who served as the White House Communications Director; he was named as an advisor & ambassador. This move was made in order to attract more mainstream attention to the platform. The same thing happened in 2021 when Uniswap, a decentralized finance (DeFi) project hired Pharrell Williams, Grammy Award-winning artist and producer, as a strategic advisor for its operations. Consequently, this development was readily welcomed by the cryptocurrency community following speculations that such participation could draw more focus on DeFi from regular users.

However, not every use of an ambassadorship has positive consequences for the crypto market. Sometimes firms or projects have been accused of using celebrity endorsements to pump up token prices or promote fraudulent schemes. On top of this, ambassadorships could help mould public opinion regarding a particular project or company in the cryptocurrency sector. However, potential investors should conduct research independently, instead of relying merely on

---

<sup>270</sup> John Warmann, *Significance and Impact of a Brand Ambassador for Blockchain Companies*, KEYCOINASSETS (Feb. 5, 2019), <https://keycoinassets.com/the-significance-and-impact-of-a-brand-ambassador-for-blockchain-companies/>.

celebrity endorsements or influencer marketing while making investment decisions.







## Chapter 5

# Mastering Crypto Trading : A Layman's Guide to DYOR (Do Your Own Research)

*"Every smart person that I admire in the world, and those I semi-fear, is focused on this concept of crypto for a reason. They understand that this is the driving force of the fourth industrial revolution: steam engine, electricity, then the microchip - blockchain and crypto is the fourth."*

— **Brock Pierce**<sup>271</sup>

### Synopsis

- 5.1 DYOR: Why It Matters in the Crypto Space
- 5.2 Volatility is Normal
- 5.3 A Beginner's Checklist: Essential Factors to Consider Before Investing

---

<sup>271</sup> Brock Pierce, Every smart person that I admire in the world, and those I semi-fear, is focused on this concept of crypto for a reason. They understand that this is the driving force of the fourth industrial revolution: steam engine, electricity, then the microchip - blockchain and crypto is the fourth., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

The abbreviation DYOR, stands for “do your own research,” is commonly used in the cryptocurrency sector. The idea is simple and that is to conduct thorough research by oneself before investing in any project so as to avoid scams and frauds among other risks.

## 5.1 DYOR: Why It Matters in the Crypto Space

DYOR is a highly relevant and important factor in the cryptocurrency industry. Because of the cryptocurrencies’ decentralized and unregulated nature, there are many scams and fraudulent projects that can easily lure innocent investors into them. This way, you may possibly get an insight about a project, the team involved and their objectives, so as to determine if it’s a genuine opportunity or just another scam.<sup>272</sup> Conducting research will also help yourself protect from scams in crypto while achieving greater understanding of these investments. Familiarity with market dynamics such as trends/ movements in investor behaviour has been known to help identify suitable chances for making informed investment choices about one’s cryptocurrency holdings. Besides losing money through scamming activities, doing extensive research will aid one to make more rational decisions when investing. By analyzing a project’s white-paper, development team, community engagement amongst other factors, one can evaluate its potential for success and be better placed when deciding whether or not to invest.

Furthermore, the cryptocurrency industry is controversially known for many scams and fraudulent projects that have happened over time. This is the reason why a comprehensive research should be done before making any investment in this field. One example of a scam like this was the Bitconnect lending and exchange platform which promised huge returns on investment. High returns lured many investors to it but at the end it turned out to be Ponzi scheme

---

<sup>272</sup> Edul Patel, *Why is DYOR important while investing in crypto?*, THE ECONOMIC TIMES, <https://economictimes.indiatimes.com/markets/cryptocurrency/why-is-dyor-important-while-investing-in-crypto/articleshow/97942839.cms?from=mdr> (last updated Feb. 15, 2023, 1:36 PM).

leading to loss of millions of dollars by all its users.<sup>273</sup> Another real case of this is ONE coin, which pretended to be a crypto currency but eventually turned out as just another fake scam.<sup>274</sup> Investors were given promises of high profit margins alongside their investments, yet the project had no real technology or blockchain through which it can backup its claims. In these two cases, big sums of money were lost by non-researchers before they invested in either business. Those losses could have been avoided if the concerned investors had researched and did the due diligence from their end.

One major aspect when investing in cryptocurrency market is conducting DYOR. It will protect an investor from scams and other fraudulent projects while allowing you to make informed decisions about the intended investments. The white paper, team composition, community engagement among others are some of the major factors that must be looked into, when checking whether an investment should be made based on how likely the project would succeed or fail according to its potential as stipulated in these documents.

### 5.1.1 Navigating the Risks: Key Rules and Principles of the Crypto Market

#### 1. “Only invest what you can afford to lose...”

The most essential principle for investing in cryptocurrency is that it should not be beyond your financial capability. This comes from the fact that the price of cryptocurrencies can be highly volatile, meaning that an investment’s worth can change dramatically over a short period. Spending more than one's means on investments causes great anxiety, and this may lead to making bad decisions.<sup>275</sup> If, for

---

<sup>273</sup> Press Release, Department of Justice, BitConnect Founder Indicted in Global \$2.4 Billion Cryptocurrency Scheme (Feb. 25, 2022), <https://www.justice.gov/opa/pr/bitconnect-founder-indicted-global-24-billion-cryptocurrency-scheme>.

<sup>274</sup> Press Release, Department of Justice, Co-Founder Of Multi-Billion-Dollar Cryptocurrency Pyramid Scheme “OneCoin” Pleads Guilty (Dec. 16, 2022), <https://www.justice.gov/usao-sdny/pr/co-founder-multi-billion-dollar-cryptocurrency-pyramid-scheme-onecoin-pleads-guilty>.

<sup>275</sup> Marcos Cabello, *New Year, New Savings Plan: 5 Smart Tips for Beginning Investors*, CNET (Jan. 2, 2023, 6:15 AM), <https://www.cnet.com/personal->

instance, you've put much savings into a single digital currency and in less than no time, its cost falls on a massive scale, then you'll find yourself disposing of it at a loss just to cater for your bills. Thus, leading to panic selling cycle, hence resulting in missing potential gains later.<sup>276</sup> If one can afford to part with the money then he or she can approach investing into cryptocurrencies with an open mind and make better investment decisions. This also means that you can seamlessly go through market slumps without getting into serious financial trouble. An example of this could be setting a personal budget for investing in cryptocurrency. This allows one to avoid taking on too much debt, potentially putting your financial future at risk. Furthermore, it is important that one must be prepared to hold onto them long term as opposed to selling them off in panic during downturns.

A case in point would be the 2017 crash of the cryptocurrency market.<sup>277</sup> Many investors put huge sums of money on virtual currencies such as Bitcoin, Ethereum and others, while expecting and anticipating their prices to rise further. However when the market crashed, prices went down considerably leading many investors making losses before they could sell off their investments. Those who were hit hardest, were those who had invested beyond their affordability limits while others had stayed calm and preserved their investments until when prices rose subsequently. Actually, the concept of investing only what you can afford to lose is an important principle in cryptocurrency investing which may help one to avoid big financial pain and make better investment decisions.

## **2. “Don’t follow the crowd – it may lead to regrets...”**

So many investors make the error of following trends, just because others are doing it especially in the unstable world of

---

finance/investing/new-year-new-savings-plan-5-smart-tips-for-beginning-investors/.

<sup>276</sup> Akhilesh Ganti, *Panic Selling*, INVESTOPEDIA, <https://www.investopedia.com/terms/p/panicselling.asp> (last updated Sept. 21, 2022).

<sup>277</sup> David Reid & Arjun Kharpal, *Bitcoin suffers mystery flash crash on popular cryptocurrency index*, CNBC (Oct. 10, 2017, 5:58 AM), <https://www.cnbc.com/2017/10/10/bitcoin-price-falls-after-russia-proposes-ban-on-exchanges.html>.

cryptocurrencies.<sup>278</sup> It is important to note however that every investment has a risk reward ratio and therefore blindly following people may result into huge losses. Here are a few reasons why you should avoid investing in something just because others are doing it:

**No guarantee of success:** A large number of investors are putting their money into a certain cryptocurrency or token, even though there's no assurance that it will succeed. It is crucial for you to do your own research and analysis, in order to see if they have any potential as viable investments.

**Herd mentality:** This might be dangerous due to herd behaviour, where people invest in particular assets just because everyone else does. In addition, this leads to an unjustified price surge followed by a sharp correction later on.<sup>279</sup>

**Lack of personal investment strategy:** Blindly following the crowd can imply that you are equally not investing in line with your personal investment strategy. This could result in a mismatch between your investment targets and the investment itself thereby leading to an inadequate decision on investments.

**Market manipulation:** The market can be manipulated by large investors or groups of investors who create a buzz around an individual cryptocurrency to push up its price. In this regard, it is possible for investors to easily succumb to a false sense of comfort only for them to realize sharp price correction when hype would have ended.

Hence one should do his/ her own research before investing in any asset unlike following the crowd. Additionally, one needs to know about his or her risk appetite, and other factors such as goals and plans so that one should make wise decisions concerning investments in the crypto ecosystem.

---

<sup>278</sup> NDTV, *Planning To Invest in Cryptocurrencies? Here's How To Reduce Risk Of Losing Money*, NDTV PROFIT, <https://www.ndtv.com/business/investing-in-cryptocurrencies-here-s-how-to-reduce-the-risks-2495248> (last updated Aug. 8, 2021, 5:27 PM).

<sup>279</sup> Bouri, E., Gupta, R. and Roubaud, D. (2019) "Herding behaviour in cryptocurrencies," *Finance Research Letters*, 29, pp. 216–221. Available at: <https://doi.org/10.1016/j.frl.2018.07.008>.

### 3. “Don't panic sell or buy during market volatility...”

Cryptocurrency markets are volatile. Within hours prices may swing greatly, thus resulting into significant gains or losses for the investor. During periods of high market volatility one's emotions might get out of hand making him/ her buy or sell out of panic. However, making decisions based on emotions instead of solid investment strategies can lead to significant losses. Here are some reasons that why it is important to not panic sell or buy during the market volatility:

## 5.2 Volatility is Normal

First and foremost, one should keep in mind that volatility is a typical feature of the crypto market. Prices can change because of different reasons such as events, regulations and marketing sentiments. Investors who accept volatility as a normal part of the financial market can be better prepared for both ups and downs.

### 5.2.1 Short-term Losses Can Turn into Long-term Gains

Crypto investment is a marathon, one might experience short-term losses along the way. However, investors who engage into panic selling during times of market volatility fail to take advantage of potential long-term gains. Cryptocurrency prices typically recover quickly after dramatic declines, and investors who stay on track can enjoy considerable benefits. For example, in the early 2018 for instance, Bitcoin's price drastically lowered from an all-time high reaching almost \$20,000 to below \$4000 within just a few months.<sup>280</sup> Many investors panicked and sold their holdings thinking this was the end of the market. Nevertheless, those who kept faith with it, were rewarded by significant increases over ensuing years when bitcoin prices went beyond their previous heights.<sup>281</sup>

---

<sup>280</sup> Jonathan Garber, *Bitcoin plunges back below \$4,000*, BUSINESS INSIDER (Nov. 30, 2018, 6:59 PM), <https://markets.businessinsider.com/currencies/news/bitcoin-price-plunges-back-below-4000-2018-11-1027770955>.

<sup>281</sup> Jasper Jolly, *Bitcoin price hits all-time high of almost \$20,000*, THE GUARDIAN (Nov. 30, 2020, 7:44 PM),

### 5.2.2 Emotional Decisions Can Be Costly

In the crypto market, choosing emotions over sound investment strategies could prove to be costly.<sup>282</sup> For instance, panic selling during a slump may lead to significant losses when prices recover rapidly. Alternatively, panic buying during an upswing may end up buying at the top of the markets leading to losses when prices eventually correct. Traders that make their decision using rational analysis and long-term investment strategies are more likely to succeed in the crypto-market.

### 5.2.3 Timing the Market is Difficult

Cryptocurrency investing is one area where timing can make or break it for you. No one can accurately predict how prices will move in a short period of time, and trying to do so can result in costly errors. Investors who attempt to time the market could either lose out on substantial gains or end up with huge losses. For example, if an investor panicked and sold his Bitcoin during market crash 2020 then he missed out on high returns, since then Bitcoin has recorded higher highs than before. Similarly, someone who panicked and bought at very high price levels during late 2017 price spike ended up losing big as prices soon fell.

### 5.2.4 Stick to Your Investment Strategy

The crypto market requires that you have an investment strategy which makes sense. It is important to know your risk appetite, objectives and time horizons before committing your money. Furthermore, once the trading plan has been set up, it is necessary to stick to it, no matter what happens in the market. For example, if your investment strategy involves holding Bitcoin for a long time, then you need not cash out because of a temporary decline in prices. Instead, remain faithful to your original plan.

---

<https://www.theguardian.com/technology/2020/nov/30/bitcoin-price-hits-all-time-high-of-almost-20000>.

<sup>282</sup> Ahn, Y. and Kim, D. (2021) "Emotional trading in the cryptocurrency market," *Finance Research Letters*, 42, p. 101912. Available at: <https://doi.org/10.1016/j.frl.2020.101912>.

In conclusion, it is important not to panic sell or buy during periods of high market volatility in crypto markets. Emotional reactions rooted in fear or greed often prove very costly and market timing isn't easy. Ultimately investors who have a solid investment strategy and abide by their plans are more likely to succeed over the long term.

### 5.2.5 “Keep track of your portfolio and adjust it as necessary...”

When investing in cryptocurrencies, one should always watch his/her portfolio and make the needed changes, if necessary. The following are some reasons that why this actually matters:

**Rebalance your portfolio:** The value of cryptocurrencies can fluctuate significantly because the crypto market is very unstable. It is therefore important to re-balance your portfolio on a consistent basis, so as to maintain an appropriate mix of assets.<sup>283</sup> One cryptocurrency may outperform others and therefore take up greater proportion of your entire investment pool. Conversely, another one might underperform resulting in significant decrease of its worth, such that it constitutes a smaller portion of your investments.<sup>284</sup> Therefore rebalancing allows you to tweak weightings in your portfolio so as to ensure that there is enough diversification and spread within each.

**Manage your risk:** Your knowledge about your portfolio will help you manage risk better. Investing heavily in one cryptocurrency, for instance, exposes you to concentration risk where you are too biased towards a single asset class.<sup>285</sup> You can identify these

---

<sup>283</sup> Kevin L. Matthews II, *Regular portfolio rebalancing is key to keeping your investment strategy on track. Here's how to do it*, BUSINESS INSIDER (July 15, 2022), <https://www.businessinsider.com/personal-finance/rebalance-portfolio?IR=T>.

<sup>284</sup> Edul Patel, *Why Is diversification of a crypto portfolio so important*, FINANCIAL EXPRESS, <https://www.financialexpress.com/blockchain/why-is-diversification-of-a-crypto-portfolio-so-important/3014652/> (last updated Mar. 20, 2023, 9:56 AM).

<sup>285</sup> Keith Noreika, Sudhir Jain & Joshua Kuntz, *Crypto Requires Robust Risk Management Framework*, PATOMAK GLOBAL PARTNERS (Nov. 22, 2022), <https://patomak.com/2022/11/22/crypto-requires-robust-risk-management-framework/#:~:text=Concentration%20risk%20can%20take%20many,and%20certain%20types%20of%20collateral.>

concentration risks by keeping track of your portfolio holdings and subsequently adjust them downwards.

**Monitor your returns:** Portfolio tracking enables one to observe his or her returns and evaluate how well the investments have been doing so far. Looking at the portfolio's performance would show which investments are giving profit, while some may not be performing well. Such information can direct decisions about what assets should be bought or sold.

**Stay up-to-date with the market:** Checking the market means staying aware of news, trends, and occurrences that will influence your investments. Being in touch with what is happening can enable you to make informed decisions on cryptocurrencies.

**Take advantage of opportunities:** By keeping an eye on your portfolio, you can be able to identify opportunities for buying or selling off cryptocurrencies at the right time. For instance, if you realize that a cryptocurrency you are holding has experienced a significant increase in value, you may choose to sell it out and take profits. On the other hand, if there is an opportunity of buying a cryptocurrency at low price, one should take advantage of it by increasing their position.

Overall, monitoring portfolios remains key in successful digital currency investment. Through regular monitoring of your investments, the risk management becomes effective as well as taking the advantages of available market prospects.

### 5.2.6 “Don't invest in projects or coins that you don't understand...”

Investing cryptocurrency might seem attractive because the market is loaded with new interesting projects but it matters that what exactly are you investing into and why. It's vital to spend some time figuring out about the project or coin before putting any money into them. Here are some reasons why one should not invest in projects or coins that he or she do not understand:

**You may lose your investment:** There is a risk of losing your investment when you invest in things that you do not understand. You can make wrong decisions on investing unknowingly without a

proper understanding of the project or coin and consequently one might lose out.

**You may fall for scams:** If you do not know what you are investing into, there are many scams in cryptocurrency which could easily trap you.<sup>286</sup> They normally come up with projects or coins with an intention to steal money from people after which they finally disappear.

**You may miss out on better investment opportunities:** Lack of knowledge on the projects or coins might lead one to missing better chances of investments.

**You may not be able to make informed decisions:** You won't have enough information to decide whether it's time for buying or selling, if you don't understand the project or coin well, this may result into missed opportunities as well as financial losses.

### 5.2.7 “Use stop-loss orders to limit your losses...”

It is important when investing in cryptocurrencies to have a risk management strategy. There is one such strategy called as stop-loss orders.<sup>287</sup> A stop-loss order is an instruction given to sell a certain cryptocurrency automatically if its price falls below a particular level. Thus, if there is a sudden market downturn or another unpredictable price movement, they may avoid considerable losses. One of the main things about using this kind of orders is helping investors not making emotional decisions during market volatility periods. Usually people become distracted by various noises of price changes either because they are too excited or afraid thus take quick actions which could mean instant monetary loss on their part.<sup>288</sup> By setting up the stop loss order investors can eliminate feelings from their decisions and

---

<sup>286</sup> Coryanne Hicks, *5 Crypto Scams To Watch Out For*, FORBES ADVISOR, <https://www.forbes.com/advisor/investing/cryptocurrency/top-crypto-scams/> (last updated Jan. 3, 2023, 1:21 PM).

<sup>287</sup> Gemini, *Basic Trading Order Types*, CRYPTOPEDIA, <https://www.gemini.com/cryptopedia/crypto-trading-strategies-trading-basics-limit-orders> (last updated Mar. 11, 2022).

<sup>288</sup> Chad Shoop, *Navigating the Most Exciting Time — Earnings Season!*, BANYAN HILL PUBLISHING (Apr. 13, 2021), <https://banyanhill.com/navigating-most-exciting-time-stock-market-earnings-season/>.

follow prior planning. Another pro of using stop-loss is that it helps curbs an investor's losses in the event of a sudden decrease in prices. A stop-loss order, for instance, can place an automatic sell once a cryptocurrency experiences a sudden decline at a specified price, which results to a limited loss.

Nonetheless, it is important to recognize that this does not make stop-loss orders bullet-proof and they are fraught with risks. For example in highly uncertain markets, stop-loss order may fail to execute at the desired price thereby resulting in bigger than expected loss. Also, during short-term fluctuations of the prices, these orders might be triggered resulting unnecessary sales and potential lost profits. Generally speaking that the use of stop-loss orders when trading cryptocurrencies is valuable because it helps in managing the risk. By creating clear parameters for sale, investors can keep their losses low and avoid making emotionally-based decisions. Nevertheless, one should be careful to employ them along with his/her comprehensive trading strategy as well as take into account certain potential threats attached to such operations.

### 5.2.8 “Don't invest all your money in one coin or project...”

Diversification is a basic tenet of investing that extends to cryptocurrency trading also.<sup>289</sup> One common mistake among traders is to put all funds into one coin or project. It is a dangerous way of doing business because if the coin or project has any challenge, the trader may end up with no money at all. One should always think about diversifying the portfolio and investing in different types of cryptocurrencies as this will reduce risks and protect against the total damage from an unsuccessful investment. Fluctuations in prices occur very often in the world of cryptocurrencies as it is highly volatile. Traders must therefore be ready to face such volatility and adjust their portfolios by adding more coins or removing others. Also this kind of strategy helps for reducing the market volatile risk.

---

<sup>289</sup> Colin Dodds, *Portfolio diversification: What investors need to know*, BRITANNICA MONEY, <https://www.britannica.com/money/portfolio-diversification-benefits> (last updated Mar. 09, 2023).

For instance, a trader can have 40% of their portfolio invested in Bitcoin, 30% in Ethereum, 20% in Ripple, and 10% on other altcoins. However, this distribution can be changed depending on market conditions, however keeping open diversification. Hence, instead of putting all your money in one coin or project, you should choose another strategy of investing. A very crucial aspect in crypto trading is a diversified portfolio because it effectively manages risk and increases returns.

### 5.2.9 “Diversify your portfolio across different coins and projects...”

One of the greatest principles in crypto trading is diversification. Diversification is an approach that helps spread investments among various asset classes as a way to reduce risk. This ensures safety for investors against any risks associated with having only one asset or market. In cryptocurrency world, diversification matters even more due to high volatility as well as risks involved in this market. Thus, spreading risk by diversifying across various coins and projects will increase your chances of long term profitability. If you own several types of currencies and projects, one failure will not affect everything, like if you had invested all the money into one type or project, instead this might provide a better return. Diversification also enables an investor to capitalize on the potential growth in various sectors of the cryptocurrency market such as, for instance, by investing quite a lot on Bitcoin and Ethereum, and not much on Cardano and Polkadot. This way can be advantageous because it will help you to make profits from both possible growth rates in well-established coins and new ones.

It’s worth mentioning that diversification doesn’t assure profits or eliminate risks entirely. What it does, however, is managing the risk to mitigate its impact on your portfolio. To diversify the portfolio, one should study different coins and their projects to determine which have the potential for good performance.<sup>290</sup> For

---

<sup>290</sup> Paulina Likos, *7 Ways to Diversify Your Crypto Portfolio and Limit Risk*, U.S. NEWS & WORLD REPORT (Mar. 22, 2022), <https://money.usnews.com/investing/cryptocurrency/slideshows/ways-to-diversify-your-crypto-portfolio-and-limit-risk>.

example, this research may involve looking at aspects like who founded the project, what technology backs up the coin and if there are any reasons why someone would want to use that coin in real life. When diversifying your portfolio, it is also advisable to keep track of how much each coin or project takes in relation to your entire portfolio. The last thing you need is putting too many eggs into one basket with increased risk exposure. It is generally considered wise not to allocate more than 5-10% of your total assets into any single coin or project.<sup>291</sup>

Another important thing to consider when diversifying your portfolio is to stay away from investing in similar currencies and projects. For instance, both Bitcoins and Litecoins may not bring about much diversification as they are heavily related coins by way of technology and use case. What one should do instead is to look for different technologies, use cases and growth potentials in altcoin or blockchain projects. Therefore, such an approach will provide an analysis on how one can invest in crypto assets. By doing this, one minimize the risk on a given coin while taking an advantage of the growth potential found in various sectors of cryptocurrency market. However it is important to conduct thorough research and avoid overexposure to any single coin or project.

### **5.2.10 “Stay informed about the latest news and developments in the crypto market...”**

It’s important to be cognizant of the most recent trends and new things happening within the cryptocurrency world as a key policy for being successful in crypto trading. This is because the crypto market is highly volatile, hence it changes quickly, therefore staying up-to-date with the latest news and events can help traders make informed decisions, so they don’t suffer significant financial losses. Another great way to remain updated about the cryptocurrency market is by keeping up with news sources and following social media accounts connected to it. In fact, there are multiple trustworthy crypto news

---

<sup>291</sup> Charles Bovaird, *How Much Of Your Portfolio Should Be In Crypto?*, FORBES (May 7, 2019, 3:14 PM), <https://www.forbes.com/sites/cbovaird/2019/05/07/how-much-of-your-portfolio-should-be-in-crypto/?sh=6a7bab043611>.

websites that provide latest information on market trends, events as well as regulatory changes.

On another note, one should also be attentive to developments in projects or coins that they have already invested in. It may involve going through their white-papers, official communication as well as monitoring their social media pages just to keep trail of any pertinent alteration or update capable of affecting the value. Being conscious of trends and market sentiment is another part of staying informed about the crypto market. Social media platforms such as Reddit or Twitter can give insights on how people feel about a particular coin or project. Hence, one can make better decisions when it comes to buying or selling.

On top of this, getting informed doesn't mean that one shall follow every piece of news or development in the crypto markets. Instead, Investors should focus on information and that might be the most relevant factor to their trading strategies and investments while ignoring much overload data and news availabilities.

## **5.3 A Beginner's Checklist: Essential Factors to Consider Before Investing**

### **5.3.1 Project's Objective**

It is important to consider project's objective when deciding on which cryptocurrency to invest in. The objective of the project determines the potential of the cryptocurrency to succeed in the long run. Investors should research and analyze an objective of a project before committing their money into such cryptocurrency.<sup>292</sup> Such aim must also be consistent with investor's goals and values. For example, if an investor believes in decentralized finance (DeFi), he or she might focus only on companies that want to upgrade DeFi infrastructure or create new DeFi solutions. Moreover, projects must have a clear purpose and utility for its intended audience. Cryptocurrencies that aim to solve real-world problems or provide unique value proposition have a higher potential for long-term success. For instance, Ethereum

---

<sup>292</sup> Jacob Wade, *The Fundamentals: How to Analyze Cryptocurrency*, INVESTOPEDIA, <https://www.investopedia.com/analyze-crypto-6456223> (last updated Feb. 28, 2023).

aims to be a global platform for decentralized applications, and Bitcoin aims to be decentralized digital currency.

Furthermore, the project's objective should also be examined by investors. It is important to ensure that the project has enough resources, team, and technology to reach its goals. For instance, a project that targets building a cross-border payment blockchain based platform must have a strong developer's team, financial institutions' partnerships and advanced technology needed for smooth execution of the project. Finally, investors should search for projects with clear roadmaps and timelines. A well-defined roadmap and objectives makes it easy for investors to invest in projects that will succeed in the long term. In conclusion, analyzing the project's objective is a critical factor to consider before investing in a cryptocurrency. The objective needs to align with investor's goals and values and they must be purposeful and usable.

### 5.3.2 Journey and Commitments so far of Various Crypto Projects

Understanding how far cryptocurrency has come, can give us an idea on whether it can grow or not. It is vital to know that when such coins were created at that time what was their background story and market performance among others, so as we can have prior knowledge concerning them. These factors include some of which are:

#### **Age and experience in the market:**

A cryptocurrency's age is one of the key things to consider when following its journey. The longer a cryptocurrency has been in the market, the more it has established itself and gained a following. For instance, Bitcoin was created in 2009 and has been around for over ten years now. This might give it certain credibility over the other newer cryptocurrencies.<sup>293</sup>

#### **Commitments and Roadmap:**

The roadmap of a cryptocurrency shows that what it hopes to achieve in future. These may include technology updates,

---

<sup>293</sup> International Banker, *Has Credibility in the Cryptocurrency Market Finally Arrived?*, INTERNATIONAL BANKER (June 18, 2021), <https://internationalbanker.com/brokerage/has-credibility-in-the-cryptocurrency-market-finally-arrived/>.

partnerships with other companies/ organizations, or plans for expanding their user base among others. A cryptocurrency's roadmap should be evaluated as it could indicate its future potential. A well-drafted and highly functional roadmap indicates a healthy currency.

### **Community Support:**

The support of the community plays an important role in determining that in which way the value of a particular digital asset will go on the list.<sup>294</sup> This may range from active social media involvement to development of the contributions made by individuals within that community. The more engaged and supportive the community is, the higher the chances of success for such digital assets as a result. Ethereum is an example, where there exists strong community participation in terms of development as well as overall success.

### **Partnerships:**

The legitimacy of a cryptocurrency can be boosted through partnerships with other corporates or organizations, since it is exposed to the mainstream.<sup>295</sup> For instance, Ripple has cooperated with various major banks to assist in international money transfers.<sup>296</sup> Consequently, this made Ripple become widely accepted and popularized its scope as well as credibility.

### **Regulatory Compliance:**

Cryptocurrencies' regulatory environments continues to be changing continuously. It's vital to appraise that whether the coinage complies with the existing rules and has future plans for doing so. A coin that is running outside legal frameworks might face some legal challenges that will impede its success.

---

<sup>294</sup> Stephanie Ross, *Communities and Their Importance in Crypto*, MARKET BUSINESS NEWS (Feb. 9, 2023, 9:17 PM), <https://marketbusinessnews.com/communities-and-their-importance-in-crypto/322611/>.

<sup>295</sup> James Tennant, *Why partnerships are vital for the success of cryptocurrencies*, CONVERGE (Jun. 24, 2018), <https://converge.today/article/why-partnerships-are-vital-for-the-success-of-cryptocurrencies>.

<sup>296</sup> *Ripple expands into Europe with two partnerships*, THEPAYPERS (Oct. 12, 2022), <https://thepaypers.com/cryptocurrencies/ripple-expands-into-europe-with-two-partnerships--1258720>.

### **Market Capitalization:**

This term is used to describe the overall worth of a given cryptocurrency.<sup>297</sup> Evaluating any currency's market capitalization, this usually provides an overview of how successful that currency has managed to reach global users. Healthy and prosperous currencies are characterized by huge market capitalizations while struggling currencies are denoted by low market capitalizations. In summary, assessing the journey and liabilities of a cryptocurrency can yield key insights regarding its potential for success. Some factors to consider here include age, roadmap, community support, partnerships, regulatory compliance, and market capitalization. Cryptocurrency investors therefore need to adopt a holistic approach in order to make informed choices that would maximize their chances of success.

### **5.3.3 Transparency of the Team associated with a Crypto Project**

One of the significant things to consider before investing into any cryptocurrency is how transparent is the team behind it.<sup>298</sup> Investors should study about their background as well as experience in respective fields and if they have delivered other successful projects. Having an open team means that these individuals should give information about themselves such as but not limited to, who are they? What are their qualifications? That is why such details can be found on social media handles or the project's website by anyone who wants to find out more about them. Furthermore, during project development, other important aspects were related to progress updates as well as disclosing the challenges met, if any.

Project with anonymous teams or those that provide inadequate information about themselves should be a concern for investors. Such projects are more vulnerable to fraudulent activities and the team can

---

<sup>297</sup> Coinbase, *What is market cap?*, COINBASE, <https://www.coinbase.com/learn/crypto-basics/what-is-market-cap#:~:text=For%20a%20cryptocurrency%20like%20Bitcoin,price%20of%20a%20single%20coin> (last visited Mar. 27, 2023).

<sup>298</sup> Vishal Gaur & Abhinav Gaiha, *Building a Transparent Supply Chain*, HARVARD BUSINESS REVIEW (May, 2020), <https://hbr.org/2020/05/building-a-transparent-supply-chain>.

hardly be held accountable by investors in case anything goes wrong. An Ethereum development team is one of such examples that have very open teams in this area. The crew included several crypto heavyweights like Vitalik Buterin, Joseph Lubin, and Gavin Wood, who have participated in numerous blockchain projects previously. The project team regularly updates project's progress and challenges facing them while holding open debates as well as other forms of discussions on their platform's development among members of the general public.

Contrarily there have been cases where certain crypto projects had dubious teams that raised eyebrows.<sup>299</sup> An example was Bitconnect, a cryptocurrency which turned out to be a Ponzi scheme.<sup>300</sup> The project's creators were anonymous, hence when it eventually failed, it led to some huge financial losses for stake holders and the investors could not hold them responsible. In brief, transparency with respect to the crew behind a cryptocurrency project is an important factor for consideration in investment. A team that is transparent and has a good track record can assure investors of the potential of the project being successful and on the other hand, contrastingly, an obscure team may be indicative of fraudulent activities.

#### 5.3.4. Use Cases

Before investing in cryptocurrency, one should consider use cases. A digital currency with clear real-life applications will have high demand, thus there exists more opportunities for expansion. Use cases are ways in which cryptocurrencies are used to solve human

---

<sup>299</sup> Andrew Medal, *How Cryptocurrency Projects Are Tackling Transparency and Security Problems*, ENTREPRENEUR (Jun. 27, 2019), <https://www.entrepreneur.com/money-finance/how-cryptocurrency-projects-are-tackling-transparency-and/335944>.

<sup>300</sup> Bloomberg, *BitConnect's Satish Kumbhani charged by US in \$2.4 billion Ponzi scam*, THE ECONOMIC TIMES, <https://economictimes.indiatimes.com/tech/technology/bitconnects-satish-kumbhani-charged-by-us-in-2-4-billion-ponzi-scam/articleshow/89844151.cms?from=mdr> (last updated Feb. 26, 2022, 11:47 AM).

problems or meet market needs.<sup>301</sup> When you look at most digital currencies, they have some use case that makes them stand out from others, other than just being store of value instruments like Bitcoin. Examples of popular use-cases for cryptocurrencies include:

**Payment and Remittance:** Cryptocurrencies could be used as means of payments or sending remittances without using traditional banking services which are expensive and slow. For instance, XRP (Ripple) cryptocurrency can be used for transactions by several retailers who accept it as payment for goods and services bought from them.

**Decentralized Applications:** Decentralized applications are supported by many crypto currencies and they can build a variety of applications in different sectors like finance, health care, social media among others. Ethereum is a popular cryptocurrency for creating decentralized applications.

**Privacy:** By using sophisticated encryption technologies to hide transaction details, some cryptocurrencies like Monero and Zcash put priority on their customers' privacy, particularly those that want to keep their financial information confidential.<sup>302</sup>

**Investment and Store of Value:** There are some digital currencies that are purely designed as store of value or long-term investments. Bitcoin, for instance, is often likened to gold because it is considered a safe haven asset which will preserve its worth over time. Therefore, when assessing the use cases for any given cryptocurrency one must consider the potential demand for this use case and whether it provides unique solution to real world problems. A highly impactful cryptocurrency would have more demand, thus it has a high growth chance.

---

<sup>301</sup> *Popular blockchain use cases across industries*, STANFORD ONLINE, <https://online.stanford.edu/popular-blockchain-use-cases-across-industries> (last visited Mar. 27, 2023).

<sup>302</sup> Li, J. (2022) "The development of Blockchain Privacy Protection: From bitcoin to Monero," *Third International Conference on Electronics and Communication; Network and Computer Technology (ECNCT 2021)* [Preprint]. Available at: <https://doi.org/10.1117/12.2629737>.

### 5.3.5 Tokenomics

Tokenomics is the term for the economic aspects behind a cryptocurrency or blockchain project which includes the total supply of tokens, how they are distributed and what utility that particular token has.<sup>303</sup> Tokenomics can affect the value and stability of any crypto coin that one would like to invest in. Thus, before investing in it, an investor must comprehend its tokenomics.<sup>304</sup> Here are some key things to consider with respect to the tokenomics:

**Total supply:** This term refers to how many units will ever be available in circulation for a given coin or token. A lower total supply means that there is potential for a higher value of the token as long as there is demand for it. The maximum supply of bitcoins, for instance, is 21 million coins and that makes them scarce.<sup>305</sup>

**Distribution:** How tokens are distributed can also impact their value. An ideal distribution should be transparent and equitable by allocating a significant proportion to the community, instead of just a handful people or institutions controlling all such coins. The projects with more distributed distributions also tend to have stable prices because they cannot be easily manipulated by market forces.

**Token utility:** Tokens must be useful in the project's ecosystem.<sup>306</sup> For instance, there are tokens that can be used for payment of transaction fees or accessing a certain platform's features. If a token doesn't have any practical use then its value may not hold up itself on a long run.

---

<sup>303</sup> Stuart Langridge, *What Is Tokenomics?*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/article/what-is-tokenomics> (last visited Mar. 27, 2023).

<sup>304</sup> Sean Stein Smith, *Web3 Needs Blockchain And Tokenomics To Succeed*, FORBES (Feb. 27, 2023), <https://www.forbes.com/sites/digital-assets/2023/02/27/web3-needs-blockchain-and-tokenomics-to-succeed/?sh=4a102dc3620d>.

<sup>305</sup> Steven Ehrlich, *The 21 Million Question, Is Bitcoin Supply Really Capped?* FORBES (Mar. 9, 2023), <https://www.forbes.com/sites/digital-assets/article/the-21-million-question--is-bitcoin-supply-really-capped/?sh=6f4246447984>.

<sup>306</sup> *Utility Token Definition*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/glossary/utility-token> (last visited Mar. 27, 2023).

**Token inflation:** Token inflation rate implies how much fresh tokens are made at any particular time frame.<sup>307</sup> A high inflation rate makes the coin lose its value over time as more tokens enter the market.

**Staking and rewards:** Some coins allow owners to earn extra money by staking them within a network or participating in the project governance. The rewards may include additional coins, transaction fees or other benefits. These characteristics can help promote holding onto tokens for long term and increasing their values.

### 5.3.6 Burning Mechanism

The “combustion/ burning mechanism” is a feature in some cryptocurrencies that includes destroying a portion from the total supply of coins or tokens.<sup>308</sup> This is frequently done to intensify scarcity and value of the remaining tokens. The concept behind burning mechanism is that lowering the overall supply of a cryptocurrency will increase demand for remaining tokens, potentially resulting in an upward price movement.<sup>309</sup> It also helps fight inflation because the total supply dwindles over time. Another example will be Ripple’s XRP which has built-in feature that destroys small units of XRP whenever there is any transaction on its network.<sup>310</sup> This action also helps to prevent spam attacks thereby reducing the overall XRP supply through time.

---

<sup>307</sup> CNBCTV18.com, *Explained / Inflationary and deflationary cryptocurrencies*, CNBC (Apr. 21, 2022, 9:10 PM), <https://www.cnbctv18.com/cryptocurrency/explained--inflationary-and-deflationary-cryptocurrencies-13226952.htm>.

<sup>308</sup> Nathan Reiff, *What Does It Mean to Burn Crypto? Practical Applications*, INVESTOPEDIA, <https://www.investopedia.com/tech/cryptocurrency-burning-can-it-manage-inflation/> (last updated Jun. 2, 2022).

<sup>309</sup> CNBCTV18.com, *Explained / Coin Burning: How is it done & why?*, Coin Burning: How Is It Done & Why?, CNBC (Apr. 23, 2022), <https://www.cnbctv18.com/cryptocurrency/explained--coin-burning-how-is-it-done--why-13245532.htm>.

<sup>310</sup> *What Is BNB Auto-Burn?*, BINANCE ACADEMY (Jan. 12, 2022), <https://academy.binance.com/en/articles/what-is-bnb-auto-burn>.

If investors are considering the burning mechanism of cryptocurrencies, they should look at the frequency and amount of tokens that are being burnt as well as its effect on the overall supply and demand of cryptocurrency. Another key aspect to consider is the underlying technology and use cases of such cryptocurrency, as well as the team behind it and its regulatory environment.

### 5.3.7 Community associated with a Crypto Project

If one wants to invest in a particular cryptocurrency, he or she should investigate the community behind it. The community may help one understand that what the project is all about and even determine that whether the users will eventually adopt and use it for their best. A strong faith in the future of the project and its actual usage can be shown by a dedicated active community. Conversely, if there are few members who participate less frequently, it is possible that the project lacks broad support or has a hard time gaining traction.

How big the population of users is also significant. A diversified extensive class might bring in new ideas while a small homogeneous one may struggle to innovate and change as per emerging challenges. For instance, Bitcoin has a big and committed following that has played crucial role in its success.<sup>311</sup> This includes developers, investors, merchants and enthusiasts who believe in the potential of Bitcoin as a decentralized and secure payment system. It is this community that has promoted adoption of Bitcoin as well as significantly contributed to its growth.

A similar case can be made with regard to Dogecoin, which maintains huge fan-base that've helped push for the uptake of this cryptocurrency.<sup>312</sup> Its community consists of backers and investors who find Dogecoin as a fun-filled choice among other digital

---

<sup>311</sup> Nikolay Nikov, *Cryptocurrency Communities – Which Have Remained the Most Active (Part 1 of 4)*, THE CHAIN BULLETIN (Nov. 27, 2018, 10:31 PM), <https://chainbulletin.com/cryptocurrency-communities-which-have-remained-the-most-active-part-1-of-4>.

<sup>312</sup> CFI Team, *Dogecoin*, CORPORATE FINANCE INSTITUTE, <https://corporatefinanceinstitute.com/resources/cryptocurrency/dogecoin/> (last updated Jan. 19, 2023).

currencies. The conviction by this community about the prospects of the project have seen Dogecoin achieve new market capitalization levels and increased adoption rates. In essence, size, loyalty, diversity of membership in a cryptocurrency's community provides some important insights about how likely it is that the project will eventually succeed. These are things one should look at before investing in any cryptocurrency so that they make informed decisions and minimize risks.

### 5.3.8 The Best Social Media Forums for Crypto across the Internet

Social media is an indispensable part of tracking trends in crypto when you consider how different it is from traditional finance. Here are some of the popular ones:

**Twitter:** Crypto is a community, where Twitter is widely accepted.<sup>313</sup> It is a good source of information on the latest developments in the industry and price movements in digital currencies. For instance, some of the most significant figures like investors, analysts and developers can be found in this channel.

**Reddit:** Its subreddits are dedicated to different coins. It has many cryptocurrencies communities which are active. It is one of the best platforms for crypto enthusiasts to get opinions from other people within the same niche.

**Discord:** Discord has a lot of online community messaging platforms, and this includes various servers that revolve around cryptocurrency. Many projects and communities have their servers so as to allow developers to interact with members.

**Telegram:** One messaging platform that has gained popularity among those involved in crypto because of its safety features and privacy measures is telegram. The platform allows for updates, discussions among others thus making it an ideal communication site for crypto projects.

---

<sup>313</sup> Bouteska, A. *et al.* (2023) "Effect of twitter investor engagement on cryptocurrencies during the covid-19 pandemic," *Research in International Business and Finance*, 64, p. 101850. Available at: <https://doi.org/10.1016/j.ribaf.2022.101850>.

**Bitcointalk:** One of the most established and oldest forums in the crypto community is Bitcointalk.<sup>314</sup>

**YouTube:** YouTube can be used for educational content on cryptocurrencies as well as deep analysis. Many influencers and analysts in crypto space use YouTube for expressing their thoughts and opinions on industry trends.

**LinkedIn:** For professional networking with others interested in cryptocurrency, LinkedIn is an excellent platform. There are many industry leaders to connect with, job opportunities to find, and new projects to discover. To sum up, social media plays a vital role in the presence of cryptocurrencies in our lives today. By staying tuned into these platforms, enthusiasts can keep up with current trends and developments occurring within industry, meet like-minded people and get valuable market insights.

### 5.3.9 Partnerships with Web2 and Web3 Firms

For investment purpose, partnerships with web2 and web3 firms matters a lot when it comes to investing in any particular cryptocurrency. Greater exposure, resources, credibility are some things that such collaborations bring to a digital currency project which ultimately help to boost its price.

Web2 companies are traditional tech companies that operate on the internet, like Facebook, Google, and Amazon. In contrast to web2 companies, Web3 companies include decentralized applications or protocols built on blockchain technology.<sup>315</sup> Examples of such companies include Ethereum, Polkadot and Chainlink. The advantage a cryptocurrency project would have, if it has partnered with some of the most famous web2 firms cannot be compared to others which did not do so. An instance is when a partnership has been developed between a cryptocurrency project and Google, this can increase the visibility of the project within Google's platforms

---

<sup>314</sup> *Bitcointalk*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/glossary/bitcointalk> (last visited Mar. 27, 2023).

<sup>315</sup> The Investopedia Team, *Web 3.0 Explained, Plus the History of Web 1.0 and 2.0*, INVESTOPEDIA, <https://www.investopedia.com/web-20-web-30-5208698> (last updated Oct. 23, 2022).

such as Google search and Google Ads. This could result in an increased demand for such cryptos which in turn may push up their value. Cryptocurrency projects gain from relationships with web3 firms in almost similar ways. Web3 entities provide infrastructure alongside services plus tools to help create as well as support decentralized applications. Consequently, by associating with web3 firms, these crypto projects are able to leverage into the resource pool that will enable them to develop their ecosystems.

The partnership between the Ripple and cryptocurrency project MoneyGram is a classic example of a successful collaboration. In June 2019, Ripple announced that it had entered into an alliance with MoneyGram, which is a worldwide money transfer provider.<sup>316</sup> In this connection, Ripple invested \$50 million in MoneyGram while the latter used xRapid product by Ripple for cross-border payments. As a result of this cooperation, the value of XRP token of Ripple increased considerably.

Another instance involves Google and Chainlink partnership. It was in June 2019 when Chainlink declared that it had teamed up with Google Cloud to render its oracle services on Google Cloud platform. Oracle services by Chainlink forward information from external sources to smart contracts so as to improve their efficiency and opportunities for use.<sup>317</sup> As a result of its engagement with Google Cloud, Chainlink also managed to enhance its visibility and reputation among potential investors, hence enhancing the value of LINK token extensively.

### 5.3.10 Events

In considering the investment of cryptocurrencies, a very important factor is that of events. These may range from product introductions and major announcements with respect to meetings

---

<sup>316</sup> MoneyGram, *MoneyGram Announces Strategic Partnership with Ripple*, CISION PR NEWSWIRE (Jun. 17, 2019), <https://www.prnewswire.com/news-releases/moneygram-announces-strategic-partnership-with-ripple-300869819.html>.

<sup>317</sup> Gemini, *What Is Chainlink in 5 Minutes*, CRYPTOPEDIA, <https://www.gemini.com/cryptopedia/what-is-chainlink-and-how-does-it-work> (last updated Feb. 8, 2022).

held by communities or conferences. By staying updated with such occurrences, it's possible to know that where the project is moving towards and assess its viability as well as future growth potential. A single event that can affect the price of cryptocurrencies could be a “halving”. Halving refers to when the reward for creating new blocks in a cryptocurrency’s blockchain reduces by 50%. Bitcoin experiences this approximately every four years resulting into high rise in the price of cryptocurrency due to the reduced supply.

Another one has to do with a new version release of either blockchain or cryptocurrency. For instance, Ethereum experienced increased prices caused by higher expectations of scalability and efficiency after releasing of the expected update i.e. Ethereum 2.0 in December 2020 which was much awaited for amongst investors.<sup>318</sup>

Meetups including conferences are other occurrences that must not be ignored as far as the subject is concerned. As an investor, these will help you gauge loyalty levels exhibited by their supporters while at the same time providing an opportunity for you to interact with them on individual basis through community meet-ups or forums.<sup>319</sup> Additionally, it is necessary to remain informed about the general news and trends in cryptocurrency industry beyond these specific events like regulatory developments, technological advancements as well as major partnerships and collaborations. Investors can therefore make better choices about where their money should be invested and how they can handle market fluctuations.

### 5.3.11 Integration with Other Blockchains

When contemplating investing in a cryptocurrency, one must consider its integration with other blockchains. This will largely affect the future prospects of this particular cryptocurrency as it governs that whether it can work together with other cryptocurrencies or blockchain networks or not. This can be through cross-chain bridges

---

<sup>318</sup> Wayne Duggan, *What Is Ethereum 2.0? Understanding The Ethereum Merge*, FORBES ADVISOR (Sept. 15, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-is-ethereum-2-merge/>.

<sup>319</sup> *Overview / Consensus 2023*, COINDESK <https://consensus.coindesk.com/overview/> (last visited Mar. 28, 2023).

or layer 2 scaling solutions that come in different forms.<sup>320</sup> Cross-Chain Bridges entail token and data transfer between different block chains which enhances liquidity while at the same time enabling decentralized application development based on various cryptocurrencies. Layer 2 scaling solutions such as state channels and sidechains aim to increase the throughput (number of transactions per second) of a blockchain network without compromising its security and decentralization.

Polkadot for instance, is a case of a cryptocurrency that has been extensively integrated with other blockchains. It is important to note that Polkadot is a sharded blockchain network that allows different blockchains to connect through its shared security model and cross-chain messaging protocol. By so doing, Polkadot can link with Ethereum and Bitcoin among other blockchains and enhance the transactions of assets and information between them. Another example is Cosmos, which also aspires to create the internet of blockchains.<sup>321</sup> In order to enable secure and efficient communication between different blockchains linked to the Cosmos Hub, Cosmos deploys inter-blockchain communication protocol (IBC). This makes it possible for certain specialized decentralized networks of blockchain to exist which can transact value and data between themselves. In general, a high extent of integration with other blockchains suggests how much potential a cryptocurrency may have in terms of becoming an important player in the future decentralized financial systems or blockchain environments. It is therefore vital for any investor interested in cryptocurrencies should keep track on these developments.

### 5.3.12 Rug Pulls

Rug pulls are referred to as a tactic that used during the defrauding of an entire blockchain project where founders or other whales dump their tokens, causing the value of the currency to fall

---

<sup>320</sup> Kevin Dwyer, *What Are Cryptocurrency Layer 2 Scaling Solutions?*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/article/what-are-cryptocurrency-layer-2-scaling-solutions> (last visited Mar. 28, 2023).

<sup>321</sup> CNBCTV18.com, *Explained: What is Cosmos and why is it called the internet of blockchains?*, CNBC (Dec. 23, 2021), <https://www.cnbctv18.com/cryptocurrency/explained-what-is-cosmos-and-why-is-it-called-the-internet-of-blockchains-11914832.htm>.

and leaving investors holding worthless tokens.<sup>322</sup> This is a huge turnoff for anyone investing so much into such projects. To avoid being caught up in scandalous rug pulls, it is important to conduct comprehensive research on the project.<sup>323</sup> One should look at whether or not there is transparency regarding the team, project goals and tokenomics among other things. It is also vital to be cautious about some warning signs which could be pinpointed by having a look at them closely. In addition, you should watch out for investments with overly ambitious returns or overly aggressive marketers.

Rather than putting all your eggs in one basket and making risky bets, you can invest in many coins and projects across your portfolio to hedge against such occurrences as rug pulls. You can also make sure that they do not go beyond what you had projected so that you do not make poor financial decisions with regard to your deposits. In conclusion, hawking cannot change its spots, hence it will always remain as rug puller despite the fact that people have made fortunes out of cryptocurrencies while others have suffered great losses therefrom, so one must engage themselves consciously when investing in this market.

### 5.3.13 Ratio of Token Holders or Whales

Whales are crucial in the calculation of returns for cryptocurrency investors. These can be individual or corporate entities that are involved in large-scale purchases. Their activities have a great and direct effect on cryptocurrency prices.<sup>324</sup> This could also lead to a situation where few whales control large amounts of tokens causing price manipulations and instability, if there's an

---

<sup>322</sup> *Rug Pull Definition*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/glossary/rug-pull> (last visited Mar. 28, 2023).

<sup>323</sup> Charlotte Hill & Tom Perkins, *Crypto rug pulls: The latest crypto scam*, PENNINGTONS MANCHES COOPER (Jan. 20, 2022), <https://www.penningtonslaw.com/news-publications/latest-news/2022/crypto-rug-pulls-the-latest-scam>.

<sup>324</sup> Saurav Mukherjee, *Explained / What is crypto 'whale', who manipulates cryptoworld and other questions answered*, MONEYCONTROL (May 25, 2021, 7:43 PM) <https://www.moneycontrol.com/news/business/cryptocurrency/who-is-the-crypto-whale-holding-28-of-all-dogecoin-worth-rs-8752-crore-6937831.html>.

oligopoly among token holders. For example, some cryptocurrencies have only a few whales that hold a substantial amount of the total tokens, and their endless liquidations would potentially lead to the demise of the coin. The distribution of the tokens on the other hand may be such that it is shared between many holders so as to ensure that manipulation will not be easy and less risk for investors who want to keep their money safe.

Investors can get information about token distribution from blockchain explorers, which provide details such as total supply of tokens and how they are divided among various addresses. Additionally, this information concerning different digital currencies is available online or through white papers. Before investing in a cryptocurrency, one must know about the token distribution and the impacts of whales.<sup>325</sup> They should check if the token distribution is fair and if it is exposed to price manipulation risks. A better-than-average distributed tokens ownership is believed to be good for the crypto ecosystem.

### 5.3.14 Trading Platforms

The platforms where trading takes place are important considerations before investing in a cryptocurrency. The presence and liquidity of a token on different trading platforms can have huge effects on its value as well as trading volume.<sup>326</sup> In order to find safe trading places which are not scams, investors need to get tokens that have been listed on legitimate and credible exchange platforms. There are many factors that one needs while evaluating a trading platform including reputation of the platform, safety, and trading volumes among others. Moreover, they should look out for platforms having various pairs enabling them to trade cryptocurrencies against other cryptocurrencies or convert them into fiat currencies easily.

---

<sup>325</sup> Caroline Banton, *What Is a Crypto Whale and How Do They Affect Crypto Markets?*, INVESTOPEDIA, <https://www.investopedia.com/terms/b/bitcoin-whale.asp> (last updated May. 17, 2022).

<sup>326</sup> Nathan Reiff, *Cryptocurrency Exchanges: What They Are and How To Choose*, INVESTOPEDIA, <https://www.investopedia.com/tech/190-cryptocurrency-exchanges-so-how-choose/> (last updated Oct. 5, 2022).

There are also the charges levied by the trading platform as another important consideration.<sup>327</sup> The different platforms have various fee structures and they should be evaluated by investors to ensure that they avoid very high fees which will eat into their returns. Moreover, it is advisable to consider the user interface and user experience of a given trading platform. A good trading platform should provide easy to use tools for managing your investments or executing trades while on the other hand, a poorly designed one may cause frustration and result in costly mistakes.

Lastly, visiting the regulatory environment surrounding a trading platform is relevant for any investor. There are some platforms that operates within the regulatory grey areas or those who do not comply with the local rules. These often result in legal problems and may affect token value listed on such platforms. At large, an investor must research and critically examine trading platforms where his/ her particular cryptocurrency is listed before making any investment decisions. This is through considering things like reputation, security, fees, experience relating to users as well as adherence to the laid down laws. Hence, informed investment choices can be made while minimizing the risks faced by investors.



---

<sup>327</sup> Nathan Reiff, *How Much Are Cryptocurrency Exchange Fees?*, INVESTOPEDIA, <https://www.investopedia.com/tech/how-much-does-it-cost-buy-cryptocurrency-exchanges/> (last updated Jun. 2, 2022).



# Chapter 6

## Cryptocurrencies: Best Platforms for Trading

*"I am late to the party, but I am a supporter of Bitcoin."*  
— **Elon Musk**<sup>328</sup>

### Synopsis

- 6.1 Centralised Exchanges
- 6.2 Decentralised Exchanges

There are many platforms that have been created to help buy, sell and trade a variety of different types of cryptocurrencies. For instance, there exists wide range of centralized and decentralized exchanges, peer-to-peer marketplaces as well as trading bots. Centralized Exchanges (CEXs) are the most common type of cryptocurrency trading platform which function like traditional stock exchanges. CEXs are controlled by a central authority that manages the exchange and sets up transaction charges. Moreover, these exchanges handle the user's funds and private keys which exposes

---

<sup>328</sup> Elon Musk, *I am late to the party, but I am a supporter of Bitcoin.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

users' assets at risk. However, they also provide better liquidity, advanced trading functions and broad range of available pairs to trade with. On the other hand, decentralized exchanges (DEXs) are blockchain-based and they do not depend on a central authority to oversee transactions. They execute trades using smart contracts in a manner that is devoid of trust and openness. DEXs permit users to have more control over their funds as well as private keys, thus making them as a safer option, though they are usually having less liquidity as compared to the CEXs, while the interface of the DEXs can be more complicated for beginners.

Another type of cryptocurrency trading platform is Peer-to-peer (P2P) marketplaces where buyers and sellers interact without intermediaries.<sup>329</sup> Digital assets or fiat currencies are usually used for buying and selling cryptocurrencies on P2P platforms. However, these platforms offer much privacy as compared to centralized exchanges and carry higher risks of scams. Additionally, trading bots are another form of platform which automates trading in cryptocurrencies. These bots utilize algorithms to assess market patterns and then they execute trades on the user's behalf. They can be programmed according to risk appetite, trading pairs, strategies among other preferences by traders using them. Trading bots may increase speed and accuracy but they also require some technical knowledge as well as constant monitoring to ensure that they operate correctly.<sup>330</sup> The user's preference, experience level and feature needs to determine the type of platform that can be used to trade cryptocurrencies. Each platform has pros and cons, hence it is important to research and evaluate different options before deciding on a particular platform. In addition, there are some other factors such as security, fees, liquidity, trading pairs and user interface that one should consider when selecting a trading platform.

---

<sup>329</sup> Werner Vermaak, *What Are Peer-to-Peer (P2P) Networks?*, COINMARKETCAP, <https://coinmarketcap.com/alexandria/article/what-is-peer-to-peer-p2p> (last visited Mar. 28, 2023).

<sup>330</sup> *What is a Crypto Trading Bots and How Do They Work?*, CLEARTAX (Nov. 30, 2022), <https://cleartax.in/s/crypto-trading-bots>.

## 6.1 Centralised Exchanges

Centralized Exchanges (CEX) are platforms where users can buy or sell cryptocurrencies in exchange for fiat or other cryptocurrencies.<sup>331</sup> That implies that these exchanges are centralized because a central authority operates them, handles the trading platform and keeps custody of funds belonging to users. Compared to decentralized ones, CEXs usually boast higher liquidity and they are more user friendly.<sup>332</sup>

### 6.1.1 Domestic (Indian) CEXs

These are cryptocurrency exchanges which operate within India. The Reserve Bank of India (RBI) regulates these exchanges and they must comply with guidelines established by Financial Intelligence Unit, Department of Revenue, Government of India. Some popular domestic CEXs in India includes:

- **WazirX:** It was founded in 2018 and is one of India's largest and most popular cryptocurrency exchanges. Over 100 altcoins are supported on the exchange, with competitive trading fees.<sup>333</sup> Though as a matter of fact, recently WazirX has suffered a major hack, where crores of users' fund in INR have been lost and after that there has been some restrictions on the platform users with respect to taking out their funds from the WazirX accounts. Such incident has eventually shocked the Indian Crypto community from the core because within India, WazirX used to experience one of the highest volumes in terms of crypto trading.

---

<sup>331</sup> CFI Team, *Cryptocurrency Exchanges*, CORPORATE FINANCE INSTITUTE, <https://corporatefinanceinstitute.com/resources/cryptocurrency/cryptocurrency-exchanges/> (last updated Mar. 9, 2023).

<sup>332</sup> Nathan Reiff, *What Are Centralized Cryptocurrency Exchanges?*, INVESTOPEDIA, <https://www.investopedia.com/tech/what-are-centralized-cryptocurrency-exchanges/> (last updated Aug. 27, 2021).

<sup>333</sup> Rashi Maheshwari, *WazirX Exchange Review 2023*, FORBES ADVISOR (Sept. 20, 2022), <https://www.forbes.com/advisor/in/investing/cryptocurrency/wazirx-exchange-review/>.

- **CoinDCX:** In addition to supporting over 200 digital currencies, CoinDCX is a very much liked cryptocurrency exchange in India. The trading platform of the company is user friendly and has low charges for trading.
- **Zebpay:** Founded in 2014, Zebpay, is one of the oldest cryptocurrency exchanges in India. Over fifty cryptos can be traded through this platform, which also offers a mobile app for easy trading.

### **Pros and Cons of Domestic Centralised Exchanges (CEX):**

The ease of use as well as the subject matter of high liquidity makes centralized exchanges (CEXs) popular among the traders who buy or sell different types of digital money. Global CEXs are more well-known amongst traders from all over the world, while domestic CEXs have seen increased popularity at home. Here are some of the pros pertaining to the Domestic Centralised Exchanges (CEXs):

**Regulatory Compliance:** Domestic CEXs usually must abide by regulations set forth by their home countries. This helps them to provide the traders with peace of mind, knowing that they are using an exchange subject to regulatory supervision and scrutiny.

**Local Currency Support:** This is crucial for those traders who would prefer to deposit and withdraw money in their native currency without incurring any forex charges.

**Lower Fees:** The operating costs of domestic CEXs are usually low as compared with the global ones, so they can afford lower fees.

**Customer Support:** Due to the focus on specific audiences and markets, domestic Centralized exchanges arguably might have better customer support services than other types of exchanges.

Furthermore, there are some of the cons pertaining to the Domestic Centralised Exchanges (CEXs):

**Limited Trading Pairs:** These may mean that there is not enough choice for investors who have to handle many different cryptos on one platform.

**Lower Liquidity:** This usually leads to higher bid-ask spreads and less efficient price discovery, since it has got much lower liquidity as compared to global counterparts.

**Security:** They would generally have weaker security measures than the International Cryptocurrency Exchanges due to low resources and budget allocations.

**Limited Features:** These platforms often lack advanced trading features as well as tools that are available at the most global centralized exchanges. This makes these platforms inappropriate for the experienced traders who are seeking for more sophisticated options.

In conclusion, whether to settle for domestic or global CEXs remains the choice of each individual trader. Some of the advantages offered by domestic CEXs includes regulatory compliance, local currency support and lower fees, while there are also some disadvantages of limited trading pairs, lower liquidity, weaker security measures and limited features. Conversely, global CEXs provide access to more cryptocurrencies and they have higher liquidity, contains more sophisticated trading tools and offer stronger security. However, they may carry higher fees or be less compliant in certain jurisdictions.

### 6.1.2 Global CEXs

These are cryptocurrency exchanges that exist and functions from outside India. Earlier, they were not directly bound within FIU, RBI or SEBI guidelines but now they have been taken into the purview. Now, if they wishes to operate in India or wishes to serve the Indian Citizens then they have to respect and adhere to the concerned guidelines by getting them registered first with the FIU, Government of India. Addition to the local legal compliance, they may have their own operating frameworks. Some of the well known global CEXs includes:

- **Binance:** Binance is ranked as the biggest cryptocurrency exchange globally based on the trading volumes.<sup>334</sup> The

---

<sup>334</sup> Katelyn Peters, *Binance Exchange*, INVESTOPEDIA, <https://www.investopedia.com/terms/b/binance-exchange.asp> (last updated Feb. 17, 2023).

platform which has low trading fees supports the trade of over thousands of cryptocurrencies. Additionally, Binance has its own cryptocurrency called as Binance Coin (BNB), which can be used to pay for transaction fees on the platform as well as it also provides the holders for some other benefits as well such as participating in the ICOs, etc.

- **Coinbase:** Coinbase is an American based, popular digital currency exchange.<sup>335</sup> It allows the exchange of multiple cryptocurrencies and is famous for having a user-friendly interface. Coinbase also owns a debit card on which users can spend their cryptos at merchants, who accept Visa.
- **Kraken:** Kraken is another digital currency exchange based in America that facilitates over 50 types of cryptocurrencies being traded.<sup>336</sup> This company has developed a reputation for its advanced trading options as well as low trading charges.

It can be concluded that centralized exchanges are an essential component of the cryptocurrency ecosystem that enables people to conveniently buy or sell cryptocurrencies. While global CEXs function within different rules and regulations, domestic CEXs are regulated by RBI under SEBI norms. Consequently, it is paramount for users to conduct their research and choose a platform that aligns with their specific needs and preferences when it comes to trading.

Here are some of the pros pertaining to the Global Centralised Exchanges (CEXs), are as follows:

**Large user base:** Global CEXs have many users, which means they tend to have high liquidity. Liquidity refers to the ability of quickly buying or selling an asset without significantly affecting its

---

<sup>335</sup> Todd Haselton, *Here's what Coinbase is and how to use it to buy and sell cryptocurrencies*, CNBC (Apr. 14, 2021, 10:08 PM), <https://www.cnbc.com/2021/04/14/what-is-coinbase-how-to-use-it.html>.

<sup>336</sup> Shobhit Seth, *What Is Kraken? How It Works, How It Stands Out, and Issues*, INVESTOPEDIA, <https://www.investopedia.com/tech/what-kraken/> (last updated Jan. 15, 2023).

price. A higher liquidity provides a better trading experience and may also offer better prices.

**Range of trading pairs:** There are major cryptocurrencies such as Bitcoin, other altcoins, stablecoins etc., which all contribute to a wider range of traded assets that are available on International CEXs. It gives traders more possibilities for making deals in the market as well as offering more opportunities.

**Advanced trading tools:** Besides futures, margin trading and options trading are some other advanced tools offered by the most worldwide crypto exchanges. They help in trading with greater leverage than what a normal exchange would allow, additionally hedge against potential risks or even earn extraordinary incomes in future.

**High trading volumes:** Global CEXs usually have more trading volumes as compared to the domestic CEXs that lead to more price discovery and improved price efficiency.

**High-security standards:** To prevent hacking attempts, fraud or theft, the global CEXs have put up stringent measures. Some of these platforms employ multiple layers of security such as two-factor authentication, cold storage wallets, and advanced encryptions.

Here are some of the cons pertaining to the Global Centralised Exchanges (CEXs), are as follows:

**Regulatory issues:** Different countries have specific laws regarding cryptocurrencies. Therefore, Global CEXs typically face regulatory issues. Consequently, they may restrict their services in certain ways like disallowing some trading pairs and causing potential legal risks to the users.

**Lack of customer support:** Although global CEXs might have a big user base and therefore, it is usually difficult for them to provide adequate customer support every time. It can take longer before the resolution of the problems encountered or response from the customer services because there are many subscribers.

**Limited fiat currency support:** All fiat currencies might not be supported by Global CEXs and that makes it difficult for users to

make deposits or withdraw money. This can lead to additional fees or delays in transaction processing.

**Centralization:** Often times, global CEXs are centralized implying that they have one point failure only. Users' funds could be at risk, if the platform experiences any technical problems or gets hacked into.

**High fees:** Generally the trading, depositing, and withdrawing funds usually attract high costs from global CEXs. Such fees erode the users' gains and for some traders they are unaffordable.

### 6.1.3 Centralised Exchanges: Domestic vs Global

As a matter of fact, both the domestic and the global centralized exchanges have their own pros and cons with regard to the needs of a particular trader or investor in the crypto ecosystem. Hence, an individual's preference upon a global CEX over the domestic CEX or vice-versa is very subjective. The good thing about domestic centralized exchanges is that they are regulated by authorities experts in line with a given country's law. This, therefore implies that users can be confident of the safety as well as security of their money to a certain extent, plus the fact that such systems are genuine, hence it makes it more of an advantage to them. In addition, customer service language could be better in domestic ones. Several popular local exchanges in India includes, but are not limited to WazirX, CoinDCX or Bitbns.

However, on the other hand, the Global Centralized Exchanges might have more trading pair options and better liquidity because of more users and freedom from the local regulations. In addition to this, they can have additional tools for trading like futures or margin trade. Furthermore, these platforms could be cheaper to use as compared to the domestic ones and available in many countries hence being globalized. Such famous centralized exchanges are, but not limited to, Binance, Coinbase and Kraken. Ultimately, it is down to personal preferences regarding that which kind of a centralized exchange is the best option. For someone who wants security and regulation, a local centralized exchange may seem preferable. Conversely, a worldwide centralized exchange will suit investors that

prefer high levels of liquidity and advanced trading features. Users must always undertake their own investigations and examinations, even if it will be about the local or international based exchanges.

## 6.2 Decentralised Exchanges

Decentralized exchanges (DEX) are those type of crypto trading platform that functions through peer-to-peer networks, as opposed to being dependent on central authorities.<sup>337</sup> This allows them to be more democratic than the centralized exchanges because they have no authority or body governing them. DEXs also provide more privacy, fund control and security. One of their biggest advantages is that they are trust-less, meaning there is no requirement for users to trust a middleman or central authority to handle their funds.<sup>338</sup> It depends upon the smart contracts which automatically execute transactions without any intermediaries. Consequently, users can freely trade with each other and retain full ownership of their assets. Furthermore, DEXs do not use centralized servers, thus reducing the risk of hacking.

However, there are cons associated with DEXs too. For instance, they tend to be less user-friendly as compared to the centralized exchanges, hence making them difficult for non-tech savvy individuals to use them. Besides this, liquidity is typically lower as compared to the centralized exchanges, meaning that finding buyers and sellers for certain assets might be harder. Thus, higher fees on trades or longer transaction durations may be incurred as a result.

But despite these disadvantages, DEXs have seen increasing adoption in recent years, with several new ventures emerging. Uniswap, PancakeSwap, SushiSwap and Curve Finance are among the most popular DEXs currently. They all have different offerings and one should do some research to compare them before making a choice. Summing up, decentralized exchanges offer more inclusive,

---

<sup>337</sup> Coinbase, *What is DEX?*, COINBASE, <https://www.coinbase.com/learn/crypto-basics/what-is-a-dex> (last visited Mar. 28, 2023).

<sup>338</sup> Yoav Vilner, *Building A Trustless Exchange For The New Derivatives Paradigm*, FORBES (Sept. 11, 2018), <https://www.forbes.com/sites/yoavvilner/2018/09/11/building-a-trustless-exchange-for-the-new-derivatives-paradigm/?sh=31acba106b89>.

safer and private means of trading cryptos. Even though they may come with some drawbacks, they still remain a good alternative for traders who would rather shun any possibilities linked to the centralized exchange platforms.

- **The Process of Crypto Trading on Dex via Private Wallets:**

Trading on a decentralized exchange using private wallets might differ slightly from trading on a centralized exchange. First of all, one needs to have a private wallet compatible with the DEX platform where one wishes to trade. MetaMask, Trust Wallet or MyEtherWallet can be used as wallets for this purpose. The next step after setting up the private wallet involves connecting it to the DEX platform which is usually done by clicking on “Connect Wallet” button on the website or application of the DEX then selecting one’s wallet provider.

After successfully connecting the wallet, one will be able to see the available trading pairs on the DEX. One can then choose the cryptocurrency that he or she would like to trade and enter how much he or she want to buy or sell. Immediately, the DEX will generate a transaction requiring approval in the personal wallet, probably by displaying a notification within a particular wallet. After confirmation of it, one needs to pay the gas fees, else this won’t go through as expected. Once confirmed by the blockchain network, the trade goes through and one will receive the cryptocurrency into his or her private wallet directly. Please note that trading on a DEX through private wallets is typically more intricate and time-consuming as compared to centralized exchanges. It also provides greater privacy, security, and control over one’s assets.

- **DEX : Pros & Cons:**

Some of the pros pertaining to the Decentralised Exchanges (DEXs) are as follows:

**Decentralization:** DEX is decentralized as under that there is no central authority controlling either funds or the platform and additionally, the users have full control over their funds.<sup>339</sup>

**Security:** DEX has higher security than centralized exchanges because they are less prone to hacker attacks and user data breaches.

**Anonymity:** DEX offers anonymity by not having any need for users to provide personal information such as KYC when executing trades on such platforms.

**Transparency:** Users can view transaction history of any public address on the blockchain through DEX and the blockchain explorer.

**User control:** There are no risks of losing money to centralized control as DEX gives full control over the private keys and funds.

Some of the cons pertaining to the Decentralised Exchanges (DEXs) are as follows:

**Limited liquidity:** The liquidity of this trading platform, however, remain low as compared to that of centralized exchanges, which leads to slower trade execution at various times.<sup>340</sup>

**Complexity:** DEX trading may be more difficult than what we see in centralized crypto exchange markets, making it difficult for novice traders who have little or no experience with them.

**No fiat support:** Most of the DEX platforms do not take fiat currency, thus requiring users to convert their local currencies into cryptocurrencies before and only after that they can venture into activities on the Dex.

**No customer support:** No customer support/ back up services is available with the DEX platforms. Therefore, it is hard for one to find help when there is a problem.

---

<sup>339</sup> Insider Studios, *What is DEX — Decentralised Exchanges give investors more control and more profit*, BUSINESS INSIDER INDIA (Sept. 13, 2021), <https://www.businessinsider.in/cryptocurrency/news/what-is-dex-decentralised-exchanges-give-investors-more-control-and-more-profit/articleshow/86164969.cms>.

<sup>340</sup> Marcel Deer, *Pros and Cons of Decentralized Exchange (DEX)*, DEFIPEDIA (Apr. 5, 2022), <https://defipedia.com/blog/pros-and-cons-of-decentralized-exchange-dex>.

**High fees:** Due to low liquidity levels experienced on such a platform, high fees makes it more expensive as compared to CEXs. Hence, the increasing costs per trade made on the DEX platforms makes the hardships of the traders more tough and vulnerable.

Overall, DEX provides its customers with some control, security and transparency as compared to other alternatives, although it has limited liquidity, an aspect that makes it much complicated and incurs greater costs among others.

- **CEX vs DEX:**

Several points have to be taken into account when choosing between a centralized exchange (CEX) and a decentralized exchange (DEX).<sup>341</sup> In order to analyze that which platform is better for trading and investing, one may take into consideration some of the key factors like:

**Security:** Trading or investing in cryptocurrencies raises concerns about security. CEX is comparatively safer than DEX, since it has a centralized infrastructure. The traditional exchanges have improved as far as security is concerned due to features such as SSL encryption, two-factor authentication and complex surveillance systems that help detect and prevent fraud. Conversely, DEX's nature of being decentralized makes it highly susceptible to hacking, scams and other vulnerabilities.

**Cost-effectiveness:** Generally, sometimes CEX charges higher trading fees as compared to DEX. This arises because the centralized exchanges charge a fee for their services like trading, depositing and withdrawing among others. However, with its non-centralized nature, there are no intermediaries or middlemen who levy charges on transactions made through DEX. This leads to lower transaction costs making it to be more cost-efficient for trading.

---

<sup>341</sup> *What's the Difference Between a CEX and a DEX?*, BINANCE ACADEMY (Dec. 15, 2022), <https://academy.binance.com/en/articles/what-s-the-difference-between-a-cex-and-a-dex>.

**Decentralization:** Decentralization forms the core foundation of blockchain technology.<sup>342</sup> A decentralized exchange, popularly called as DEX does not require any intermediaries or middlemen to perform their operations. On the other hand, CEX makes use of an intermediated centralized infrastructure. This means DEX is a better alternative for trading, that is decentralized and more transparent.

**Privacy:** When deciding between CEX and DEX, privacy is yet another factor that needs to be considered. Centralized exchanges usually require users to disclose their personal information like identity cards and addresses so as to satisfy regulatory requirements. On the contrary, DEX allows traders to remain unidentified while trading without disclosure of one's personal data. Thus, it is obvious that DEX can be regarded as a platform that pays more attention for safeguarding the users' privacy.

From these considerations, it becomes hard to decide that which of the two platforms is better for trading and investing. This means that both CEX and DEX have advantages and disadvantages depending on individual user's preferences and demands. For instance, when security features are concerned, one may consider choosing a safer option called as CEX with its improved infrastructure security options which are sophisticated in nature. Although, the choice between a CEX and a DEX is quite subjective as it directly depends upon the demands and aspirations of a specific customer of crypto trading.



---

<sup>342</sup> *The Crucible of Privacy: Why Decentralized Exchange Is the Only Way*, BITCOIN.COM (Feb. 5, 2019), <https://news.bitcoin.com/the-crucible-of-privacy-why-decentralized-exchange-is-the-only-way/>.





# Chapter 7

## Crypto Crime: A Legal Perspective and Global Response

*"The computer can be used as a tool to liberate and protect people, rather than to control them."*

*—Hal Finney<sup>343</sup>*

### Synopsis

- 7.1 Unmasking Crypto Crimes: An Introduction
- 7.2 Tracing the Evolution of Crypto Crimes
- Case Studies
- Case Studies
- Case Studies
- Case Studies
- 7.3 Markets in Crypto-Assets (MiCA) Regulation
- 7.4 Navigating the Complex Legal Landscape of Crypto Crimes
- 7.5 Technological Solutions: Fighting Crime in the Digital World
- 7.6 Preventing Crypto Crimes: Key Methods of Protection

---

<sup>343</sup> Hal Finney, *The computer can be used as a tool to liberate and protect people, rather than to control them.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

## 7.1 Unmasking Crypto Crimes: An Introduction

After the launch of Bitcoin in 2009 by an anonymous person with a pseudonym of Satoshi Nakamoto, the world of finance has witnessed a drastic change. Through the encryption methods, the cryptocurrencies manage the flow of funds and authenticates the transactions while regulating the issue of other units. While offering decentralization of control and more access to financial services, cryptocurrencies has brought new possibilities of crimes as well and such offences or crimes are more specifically known as crypto crimes. Crypto-crimes are the offenses in which cryptocurrency is either involved as a payment or bargains, money-laundering, or an object of theft and fraud.<sup>344</sup> What makes it interesting to criminals is that the crypto-assets are anonymous, international calibrated and relatively novel in terms of regulations. Cryptocurrencies crimes isa multi-faceted concept that moves beyond the simple level of traditional crime and it explores the connections between emerging technology, anonymity, and financial innovation. These crimes are majorly committed based on the characteristics of the cryptocurrencies such as but not limited to pseudonymity, decentralization and non-reversible operation. These crimes capitalize on the characteristics that are unique to cryptocurrencies in order to perpetrate criminal acts with relative impunity.

Pseudonymity is now considered to be the foundation of most of the crime related to the use of Crypto technology.<sup>345</sup> Cryptocurrencies usually provide their users with more anonymity than other financial systems, while the transactions made in cryptocurrencies are closely monitored, and many of them imply systematic documentation processes. This pseudonymity implies that even though the identities of the transacting parties do not appear under their actual names as their identities are concealed under an alphanumeric addresses during the transactions on a respective blockchain. However, the data of transactions initiated occurs on a

---

<sup>344</sup> Paul Marrinan, *Crypto-crime & caveats*, THOMSON REUTERS (Mar. 29, 2021), <https://www.thomsonreuters.com/en-us/posts/investigation-fraud-and-risk/crypto-crime-caveats/>.

<sup>345</sup> *Pseudonymous*, COIN MARKET CAP (Aug. 28, 2021, 05:57 AM), <https://coinmarketcap.com/academy/glossary/pseudonymous>.

public ledger. This feature is very beneficial to genuine users but it also forms a perfect underworld for fake users as a two-way sword. An example of this would be that, the hackers can make transactions and even accept payments online and would not have to display their identity, hence it becomes a quite herculean task for the police forces to catch them. The anonymity feature associated with cryptocurrencies has been used in different wrong deeds, including money laundering, ransomware attacks, and selling of illicit goods and services.

Another key feature of cryptocurrencies, which is again very significant in the commission of the crypto crimes, is decentralization. In their operations, cryptocurrencies use distributed networks. thus, there is no authority to coordinate or regulate the transactions. This negates the conventional instruments of control that are evident in financial systems and it is majorly due to this particular fact that there is no central authority regulating the operations of Crypto Currencies for the time being. This leads to significant problems experienced by the regulators in attempting to police and/or reign in cryptocurrency related activities. To further complicate the chances of imposing regulations, the Decentralized Exchange platforms (DEXs) and peer to peer transactions do not involve the use of central servers which maybe arrested by the authorities to a certain extent. Thus, this structure offers a safe environment and stability against the shutdown by authorities, which is why it is suitable for illicit operations and accumulation of illicit money.

Another critical factor that criminals take advantage is the non-refundability of operations with cryptocurrencies.<sup>346</sup> A transaction that is once executed on the blockchain, cannot be reversed, meaning once a transaction is done then it is conclusive forever. On one hand, this feature can be regarded as a plus, since it allows for the reliability of crack down on fraudulent activities, and safekeeping of the genuine transactions. However, on the other hand, the victims of crypto

---

<sup>346</sup> Nikita Tambe and Aashika Jain, *Advantages and Disadvantages of Cryptocurrency in 2024*, FORBES (June 10, 2024, 05:18 PM), <https://www.forbes.com/advisor/in/investing/cryptocurrency/advantages-of-cryptocurrency/>.

crimes are left with virtually zero options for reclaiming their stolen monies. The victims cannot just void the payment or go to the central authority regarding such mis-happenings. The cases range from the hacking of crypto exchanges to other fraudulent transactions, as observed in the cases of many extortionate cryptocurrency exchanges and scams. This has caused huge irreparable losses to the individuals and organizations. The inexorable character of these operations offers a measure of protection to the offenders, who can easily and effectively transfer embezzled money within minutes without worrying about the rejection.

Moreover, these are the most crucial elements but still it is impossible to list all innovations and new instruments and methods of using cryptocurrencies for criminal purposes, as this area develops actively and continuously with a rapid pace. Features like privacy coins (Monero, Zcash, etc.) that offer higher privacy along with the rising usage of smart contracts for decentralized, self-executing transactions are taking a toll on it.<sup>347</sup> This becomes a complicated task as various criminals improve their respective modus operandi in the use of these technologies while executing their operations. The fight against crypto crimes is already a daunting one, and these difficulties are gradually on the rise as criminals are usually always diversifying as well as improving in the use of such technologies. In addition, the use of cryptocurrencies is unfeasible without crossing international borders, hence it immediately becomes apparent that most crimes do not occur in isolation of each other but are interlinked and this would be impossible to prosecute without the involvement of more than one dominion.<sup>348</sup> Crypto crimes exploit the features of cryptocurrencies such as anonymity, decentralization and immutability since the criminals are able to perpetrate their crimes with a very high level of anonymity and security. Over the time as this crypto network expands, it will be especially necessary for the overseeing authorities, the police departments, and the cryptocurrency community to create

---

<sup>347</sup> Robert Stevens, *What Are Privacy Coins and Are They Legal?*, COIN DESK (Aug. 08, 2022, 08:20 PM), <https://www.coindesk.com/learn/what-are-privacy-coins-and-are-they-legal/>.

<sup>348</sup> Ruta Kulkarni, *Cryptocurrency Scam Bust: International Crackdown Unveils Massive Fraud*, REGTECH TIMES (May 09, 2024), <https://regtechtimes.com/cryptocurrency-scam-bust-international-crackdown/>.

progressive measures and protocols of the united front to lessen these dangers and answer to the issues presented by the crimes related to cryptocurrencies.

The magnitude of crypto crimes ranges deeply into the composition of various stakeholders as each stakeholder is affected individually by the consequences of these illegal actions either directly or indirectly. From the financial suffering of preys to the regulatory challenges faced by governments, and the broader repercussions for authentic users, the ripple consequences of crypto crimes are intense and multidimensional. The penalties of crypto crimes are often harsh and stressful for the victims. Generally, the substantial financial losses are suffered by individuals and businesses that are targeted by hackers, fraudsters, or scammers. The stolen funds cannot be reclaimed once transferred as the irreversible nature of cryptocurrency transactions aggravates this issue. People frequently find themselves without the effective avenues for recourse or recovery as they become the victims of phishing schemes, ransomware attacks, or Ponzi schemes in the crypto space.<sup>349</sup> The decentralized and pseudonymous nature of cryptocurrencies leaves the victims with limited options only, unlike the traditional financial systems where banks and regulatory bodies can intervene to reverse the fraudulent transactions. This frequently results in considerable financial impediments, emotional anguish, and a loss of faith in the novel world of cryptocurrencies.

In the efforts to police and prevent crypto crimes, the regulators face the formidable challenges. The global and pseudonymous descriptions of cryptocurrency transactions create a complicated landscape for application. Conventional financial by-laws rely on the integrated control points, such as banks, which can be supervised and controlled. Making it difficult for regulators to impose oversight and control as the subject matter of the cryptocurrencies operates on a decentralized network without a central authority.<sup>350</sup> To further

---

<sup>349</sup> BTC Peers, *India's Cryptocurrency Wild West Leaves Victims Searching for Justice*, COIN MARKET CAP (Sept. 25, 2023), <https://coinmarketcap.com/community/articles/6511bb3ea904527b9f3025d6/>.

<sup>350</sup> Rakesh Sharma, *Bitcoin Has a Regulation Problem*, INVESTOPEDIA (Mar. 17, 2024), <https://www.investopedia.com/news/bitcoin-has-regulation-problem/#:~:text=The%20cryptocurrency's%20rise%20in%20popularity,varying%20>

complicate the matters there exists the major issue pertaining to the global reach of the cryptocurrencies as the crimes often cross multiple areas, hence requiring worldwide collaboration and management by the respective Governments at the international stage. Regulatory bodies must navigate different legal frameworks and try to enforce compliance across borders, and adapt to the rapidly evolving technology behind cryptocurrencies.

Additionally, the other bonafide consumers of cryptocurrencies are also affected by these crypto crimes, but the effects may not be as direct but they are still significant. It is with such acts that the people's confidence in cryptocurrencies is jeopardized while slowing the overall advancement of cryptocurrencies and the achievement of the possible benefits that comes with the utilization of such investments in the cryptocurrencies. Trust is one of the fundamental values in a financial system and the rapid incidences of hacks, scams and frauds work against the growth of the Crypto Market. In essence, due to some of the high-profile crimes involving bitcoin and other cryptocurrencies, the legitimate adopters of the digital currencies viz., cross border businesses, investors and those who conduct business on the online platform as well as individuals who opt for the technology to hedge against inflation, may be subject to skepticism.<sup>351</sup> This deterioration of trust can also slow down the essential innovation in the blockchain industry because those who develop blockchains and entrepreneurs who want to build the blockchain-based solutions have more significant problems in attracting investors and users to their projects.

Hence, the implications on the remainder of the cryptocurrency ecosystem are also rather substantial. Most of the times, there's something going wrong in the cryptocurrency world that is followed by demands for an increase in the regulations and that may hinder the advancement and liberty that is intended to be offered regarding such cryptocurrencies. However, it is also important to understand that

---

approaches%20to%20Bitcoin%20regulation.&text=By%20their%20very%20nature%2C%20cryptocurrencies,specific%20agencies%20within%20a%20government.

<sup>351</sup> Special Correspondent, *Survey suggests 71% have low or no trust in cryptocurrency*, THE HINDU (Nov. 24, 2021, 10:57 PM), <https://www.thehindu.com/business/markets/survey-suggests-71-have-low-or-no-trust-in-cryptocurrency/article37671635.ece>.

regulation is a tool which is used to promote the protection of users and financial systems' quality, thus, the problem of the balance between regulation and innovation is very significant. The impact of crypto crimes cannot make light to the extent to which it is being manifested among various stakeholders as for each of them it has different issues and losses that they have to face. Consumers lose money and have very few ways to get it back, while the regulators have to police the rules in an environment that is mostly international and decentralized and regular users have their trust defeated which is a barrier to the mass adoption and innovation. To combat these problems, each participant of the market should implement various changes such as but not limited to holding security measures, improving the regulative acts, raising public awareness to manage the threats and unleash more possibilities of cryptocurrencies.

## 7.2 Tracing the Evolution of Crypto Crimes

As was already mentioned that crypto crimes relates tightly to the evolution and popularization of the cryptocurrencies only. Earlier, bitcoin as well as other digital currencies were popular on line just among the technophiles and the libertarians.<sup>352</sup> However, later on such cryptocurrencies became a favorite hangout of the criminals. Also, the inception of crypto crime was linked with the takedown of Silk Road, one of the earliest large-scale criminal organizations to be dismantled. The black market known as Silk Road which was founded by Ross Ulbricht, also known as Dread Pirate Roberts, came to the online scene in 2011.<sup>353</sup> One major issue that hindered the police from arresting the culprits behind the transactions was the anonymity of the platform where Bitcoin was used and is nearly irreversible. The famous online bazaar, Silk Road, was closed by the FBI in 2013, and the site's main holder, Ulbricht, was arrested and

---

<sup>352</sup> Elizabeth Lopatto, *How bitcoin grew up and became big money*, THE VERGE (Jan. 03, 2019, 09:30 PM), <https://www.theverge.com/2019/1/3/18166096/bitcoin-blockchain-code-currency-money-genesis-block-silk-road-mt-gox>.

<sup>353</sup> *Inside the FBI takedown of the mastermind behind website offering drugs, guns and murders for hire*, CBS NEWS (Nov. 10, 2020, 11:03 PM), <https://www.cbsnews.com/news/ross-ulbricht-dread-pirate-roberts-silk-road-fbi/>.

condemned to life imprisonment without the eligibility of parole. The use of cryptocurrency and the problems associated with it and its possibilities were illustrated in the case, which attracted a lot of media coverage and prompted the regulators. Other sorrowful incident that have shaped the history of crypto crimes was the shut down of Mt. Gox in 2014.<sup>354</sup> The trading that used to go through Mt. Gox once accounted for 70% of all the Bitcoin transactions in the whole world. Though, it was not long before it faced a critical issue of security where it lost approximately 850,000 Bitcoins. The hack resulted in the shutdown of Mt. Gox and crusty losses to its users. It also gave a wakeup call to the Cryptocurrency Exchanges being inefficient and called for the development of a secure and regulated trading platforms.

Also, the emergence of ransomware attacks can be regarded as another stage in the development of the crypto-crime story. A highly vivid example of ransomware activity is the wannacry attack, which took place in 2017 and affected more than 200 thousands computers in 150 countries. The attackers requested that bitcoins to be paid to them because of the attributes of the cryptocurrency such as transferability and anonymity. Similarly, the notpetya attack later that year also used the same approach by encrypting the devices' contents. These cases showed that cryptocurrencies are capable of supporting the vast global cyberattacks and underscored the necessity of improving the cybersecurity situation. As a result of these early acts, authorities from around the world became more careful with cryptocurrencies and how they may be misused. As a measure by the inter-governmental organization to check the use of cryptocurrencies, especially in money laundering and terrorist financing, the FATF provided the standard procedures for the regulation and monitoring of cryptocurrency related businesses.<sup>355</sup> That began in countries such as the United States of America, Japan and members of the European

---

<sup>354</sup> The Investopedia Team, *What Was Mt. Gox? Definition, History, Collapse, and Future*, INVESTOPEDIA (Apr. 23, 2024), <https://www.investopedia.com/terms/m/mt-gox.asp>.

<sup>355</sup> *Updated Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*, FATF, <https://www.fatf-gafi.org/en/publications/Fatfrecommendations/Guidance-rba-virtual-assets-2021.html> (last visited July 08, 2024).

Union that required cryptocurrency exchanges to meet KYC/AML standards. Nevertheless, criminals engaged in creative thinking and new actions or methods in order to make the crime to be persisted. One of them was the transition from Bitcoin to ‘cultured’ cryptocurrencies such as Monero and Zcash, which have more better anonymity properties. This shift also increase the difficulties and obstacles of the law enforcement agencies in tracking and tracing of the foul transactions.

The cryptocurrencies ‘Initial Coin Offering (ICO) of 2017 and 2018 introduced another wave of the crypto crimes. ICOs provided a way for companies to issue new tokens or cryptocurrencies and seek funding through selling them to investors with a little to no regulation. Even as marketing schemes, ICOs were helpful for funding the development of numerous real projects, but an uncontrolled sphere attracts the scammers a lot. Many ICO scams appeared, which offered fantastic earnings to investors and disappeared as soon as they wished to collect the concerned money.<sup>356</sup> There was an instance with the bitconnect, being pointed to be a Ponzi scheme back in 2018 and this led to a significant amount of loss to investors. In recent years, crypto crimes have continued to evolve, with a few notable trends and cases illustrating their ongoing impact are as follows:

**1. Decentralized Finance (DeFi) Exploits:** With the rise in the development of the DeFi platforms, these platforms became the new kid on the block that a criminal mastermind could exploit.<sup>357</sup> These events took place in early 2020. The DeFi sphere witnessed the hacker attacks and frauds that resulted in the loss of millions of dollars. Such occurrences predominantly impacted the smart contracts and proved that the corresponding DeFi protocols require enhanced security.

**2. Ransomware Evolution:** Today’s ransomware attacks are even more severe as the criminal’s use the ‘double extortion’ strategies. In such raids, not only the data is encrypted, rather the cyber attackers

---

<sup>356</sup> *Crypto ICO Scams [A Comprehensive Guide]*, CNC INTELLIGENCE (Apr. 14, 2024), <https://cncintel.com/crypto-ico-scams/>.

<sup>357</sup> *Attacks and Exploits in DeFi*, CRYPTO.COM (Aug. 10, 2021), <https://crypto.com/research/attacks-and-exploits-in-defi>.

proceed to inform the victims that their sensitive information will be published in the public domain if they do not pay the ransom. Currently, cryptocurrencies are still considered to be the most popular means of payment for such ransoms.

**3. Regulatory Crackdowns and Legal Actions:** The governments and regulatory agencies have pulled up their socks to fight these crypto-crimes. In the year 2021, United States of America's Department of Justice declared the creation of the National Cryptocurrency Enforcement Team abbreviated as NCET that targets the fight against complicated cases involving cryptocurrency. Furthermore, massive legal activities were also introduced against the big cases like arrest and indictment of the people associated with the Bitmex Exchange for not incorporating AML policies.

**4. NFT Frauds and Scams:** The craze for NFTs also brought new types of crypto crimes as well, for instance, fake artworks. There are fake NFT projects, which is a practice where fraudsters develop an NFT project, attracts the investors and escape with the money.<sup>358</sup> The sole purpose behind such fake NFT projects is to deceive gullible consumers with the intention of making benefits out of them.

Crypto crimes have a rather rich history, which supports the idea that cryptocurrencies have a two-sided nature. It is evident that cryptocurrencies, due to their attributes such as financial inclusion, innovation and decentralization, have come with unique challenges to law enforcement agencies, regulators, and users. The use of cryptocurrencies is highly associated with anonymity and it has no geographical barriers, and its reliance upon the technology, which makes it conducive for carrying out criminal activities. With time, the criminals in the world of cryptos will also develop new ways of perpetrating their heinous activities. These risks are surmountable, though as the regulatory environment becomes more complex and improved security measures progress continually. It is crucial for anyone engaged in the use and development of cryptocurrencies to learn the historical context of the definition of crypto crimes, their potential threats, and all the current endeavours aimed at mitigating

---

<sup>358</sup> *NFT Scams – Real-life story*, FRAUD.COM, <https://www.fraud.com/post/nft-scams-a-real-life-story> (last visited July 08, 2024).

them.<sup>359</sup> The evolution of cryptocurrencies from being a unique technological phenomenon to being considered as an asset class, has been an incredible process that was accompanied by numerous complexities. When considering the future perspectives, the main challenge will be to properly regulate the cryptocurrencies while maintaining their positive effects and addressing the issues of crypto crimes that have been identified time to time. Furthermore, there is no single coherent legal definition of “crypto crime”, however, different forces of law, jurists, and various organizations have advanced with their own definitions or, in the least, the descriptions of the crimes committing within cryptocurrencies. Here are some examples along with a critical analysis of them, are as follow:

### **1. Financial Action Task Force (FATF)**

FATF stands for Financial Action Task Force or more formally it is known as Groupe d’Action Financial. FATF explains that the virtual asset-related crimes refer to offenses that center on cryptocurrencies and that may occasion risks concerning money laundering, terrorist financing, fraud, and other related crimes.<sup>360</sup> Nonetheless, FATF’s definition offers general information on the relation of cryptocurrencies with certain crimes, which, as mentioned before, involve money laundering and financing of terrorism. However, social risk is defined in a very broad manner which causes the problem of defining the range of regulating actions for such risks adequate.

### **2. European Union (EU) Directive**

According to EU Directive regarding the fight with money laundering and the financing of terrorism, virtual currencies are incorporated into the sphere of operating financial activities. It obliges the member states to apply the AML/ CFT measures concerning cryptocurrency exchange and wallet services. The EU directive recognizes the vast opportunities that exist in the usage of cryptocurrencies and at the same time addresses the risks that could

---

<sup>359</sup> *Cryptojacking*, INTERPOL, <https://www.interpol.int/en/Crimes/Cybercrime/Cryptojacking> (last visited July 08, 2024).

<sup>360</sup> *Virtual Assets*, FATF, <https://www.fatf-gafi.org/en/topics/virtual-assets.html> (last visited July 08, 2024).

attribute to it through the set standards.<sup>361</sup> The directive, therefore, seeks to combine virtual currencies into the current AML/ CFT regimes to increase on the global efforts of improving on the virtual currencies' transparency to address money laundering and other related crimes. However, the Directive targets more upon the financial crimes and might miss other type of crypto offences like cyber crimes and frauds.

### 3. Indian Regulatory Proposals

Suggested regulations in India have not been fixed and have ranged from possible prohibition of private cryptocurrencies and launching of the CBDC. All these propositions' objectives are to control the circulation of cryptocurrencies to reduce unlawful actions like money laundering, fraud, and acts of terrorism financing. The proposed regulations in India mention the government's quivers on the possible use of cryptocurrencies for unlawful activity. Thus, with proposals to either ban or restrict the use of private virtual currencies and the introduction of a CBDC, the Indian authorities intends to regulate and potentially centralise the country's digital financial transactions.<sup>362</sup> Still, despite the numerous measures that have been formulated to counter various forms of crypto-related crimes, their success depends majorly upon the factors such as the clarity of the measures under the laws, enforceability of the measures and applicability of the formulated measures to modern technological development and prevailing global legal frameworks, respectively.

### 4. United States Legal Framework

In the United States of America, it has been observed that there are no specific laws for crypto-related crime rather it falls under the jurisdiction of fraud, money laundering, securities and other related crimes. Certain government organisations like DOJ, SEC and

---

<sup>361</sup> Anna Pingen, *New Rules for Crypto-Assets in the EU*, EUCRIM (Sept. 25, 2023), [https://eucrim.eu/news/new-rules-for-crypto-assets-in-the-eu/#:~:text=The%20MiCA%20Regulation%20\(Regulation%202023,with%20investing%20in%20crypto%2Dassets](https://eucrim.eu/news/new-rules-for-crypto-assets-in-the-eu/#:~:text=The%20MiCA%20Regulation%20(Regulation%202023,with%20investing%20in%20crypto%2Dassets).

<sup>362</sup> Sneha Kulkarni, *Digital Rupee: RBI widens scope of CBDC; non-banking payment companies to facilitate transactions*, THE ECONOMIC TIMES (Apr. 25, 2024, 11:49 AM), <https://m.economictimes.com/wealth/save/digital-rupee-rbi-widens-scope-of-cbdc-non-banking-payment-companies-to-facilitate-transactions/articleshow/109054759.cms>.

FINCEN are responsible for the enforcement matters associated with cryptocurrencies. The use of cryptographic currencies and their disconnection from centralized financial structures create certain difficulties for law enforcement in the United States as well, since the existing legal regulation can hardly correspond to all the vicissitudes of the crypto-related criminality. Though, the DOJ and SEC have attempted the cases against individuals and firm involved in fraudulent ICOs, Ponzi schemes and money laundering schemes but these areas still exist that need an effective addressing.<sup>363</sup> Due to constantly emerging novel forms of cryptocurrencies, it is necessary to update the legal norms frequently and to improve the international cooperation in combating the crimes related to cryptocurrencies.

It is revealed that the definitions of “crypto crime” given by leading scholars, jurists, and international organizations are divergent. Despite this, these definitions acknowledge the possibility of unlawful activities using virtual assets, but they differ in terms of coverage and queasiness, which indicates that the law is right to regulate innovation in the digital age. An evaluation of the above definitions thus reveals the adequate need for sound and dynamic legal frameworks to meet the increasing contingencies of crypto associated criminality on one hand, and ensure sufficient promotion of innovation and consumer protection on the other hand.

## 7.2.1 Types of Crypto Crimes: A Comprehensive Overview

### 1. Frauds & Scams

Cryptocurrencies whilst disrupting the financial sector with their distinct characteristics such as anonymity and decentralization have also seen the birth of different types of frauds and scams. These are those activities that are aimed at taking advantage of the peculiarities of cryptocurrencies like anonymity, convenience in transferring, and lack of a single controlling body to act fraudulently

---

<sup>363</sup> Simona Mola, *SEC Cryptocurrency Enforcement*, CORNERSTONE RESEARCH (Nov. 15, 2022), <https://www.cornerstone.com/insights/reports/sec-cryptocurrency-enforcement/>.

against individuals and companies.<sup>364</sup> Crypto frauds and scams are misrepresentations which make one or more parties to lose their crypto or fiat currency. The essence of cryptocurrency as an instrument in monetary system increase the number of opportunities for the scammers and swindlers by playing at the technological level.<sup>365</sup> These unethical and unlawful ways impact the unsuspecting victims by exploiting the characteristics of cryptocurrencies including anonymity, decentralisation and immutability of transactions. Some of the common Crypto frauds and scams involving cryptocurrencies includes ponzi scheme, fake ICOs, phishing, pump and dump, rug pull, and fake wallets and exchanges. Deceptive investments such as Ponzi and pyramid type schemes are some of the oldest and most famous investment frauds in the context of cryptocurrencies. These schemes involve high returns and low risks to attract investors into the Fry scams. In these fraudulent investment schemes, payments to the earlier investors are generated from the money invested by the later investor, hence there exists a chimera of reasonable returns. However, such schemes are by their very nature pyramid styled and are reasonably fraudulent. Generally, the moment new entrants' money flow becomes inadequate, the scheme usually gets closed and there are probable chances that majority of the investors will end up in losing their hard earned money.

Both the pyramid schemes work in the same fashion, but each of them presupposes participants' addition in number while growing the base of the pyramid. Both schemes work on the basis of the possibility of receiving very high incomes, using the greed of investors and, at times, the need. Another common category of the crypto frauds is fake Initial Coin Offerings (ICOs). This saw a rise in the numbers of the scammers as well who saw it fit to take advantage of the legitimate ICOs. It is potentially a scam in which individuals create the appearance of a promising investment product through a

---

<sup>364</sup> *What To Know About Cryptocurrency and Scams*, FEDERAL TRADE COMMISSION CONSUMER ADVICE (May 15, 2022),

<https://consumer.ftc.gov/articles/what-know-about-cryptocurrency-and-scams>.

<sup>365</sup> Surbhi Gloria Singh, *Explained: The Rs 6,600 cr Bitcoin ponzi scam involving Raj Kundra*, BUSINESS STANDARD (Apr. 22, 2024, 03:45 PM),

[https://www.business-standard.com/finance/personal-finance/explained-the-rs-6-600-cr-bitcoin-ponzi-scam-involving-raj-kundra-124042200630\\_1.html](https://www.business-standard.com/finance/personal-finance/explained-the-rs-6-600-cr-bitcoin-ponzi-scam-involving-raj-kundra-124042200630_1.html).

well-designed website, white-paper, and marketing strategies. The said new tokens are sold to the investors so that they can make additional investments with the hope of getting high returns. After the ICOs are made and people invest in it, the promoters normally abscond with the money by leaving the investors with those crypto coins or tokens that are nearly worthless.

Phishing in the context of the cryptocurrency is a tactic where the cybercriminals try to trick a person into surrendering their private keys or login information.<sup>366</sup> These attacks tend to be represented via emails, messages, or even websites that are very similar to the ones of genuine services. The way that the criminals set up these copycat platforms is to potentially trick as many victims as possible to enter their login information and later on such credentials are captured by the attackers, who can use them to log into and steal the victims' crypto coins or tokens. Phishing takes advantage of the user ignorance and apathy, thereby, the user may not be well equipped in telling the difference between an authentic and a fake correspondence. Pump and dump emerges to be very aggressive and generally the fraudulent activities are employed by some individuals to flood the market with false information with an aim of increasing the market price for the cryptocurrency.<sup>367</sup> Subsequently the price has been pegged up by the buying activities and the manipulators cash in their shares at the prevailing high prices. In the end, good investors sell their stocks and forces the price to go down further and eventually it makes the other investors incur massive losses. These schemes are generally witnessed in the unregulated crypto markets.

Rug pulls constitutes to be a kind of fraud that has become rather widespread in the sphere of decentralized finance (DeFi). In this, generally the developers have come up with a new token or DeFi project, as he or she generally makes the attempt in order to make it popularize, so that he or she can attract funds for it via various ways

---

<sup>366</sup> Kristina Lucrezia Cornèr, *What is a phishing attack in crypto, and how to prevent it?*, COIN TELEGRAPH (July 13, 2023), <https://cointelegraph.com/learn/what-is-a-phishing-attack-in-crypto-and-how-to-prevent-it>.

<sup>367</sup> *What is a pump and dump in crypto?*, COINBASE (May 01, 2024, 07:47 PM), <https://www.coinbase.com/learn/crypto-glossary/what-is-a-pump-and-dump-in-crypto>.

including marketing and promotions. They repudiate the project and take all of the investment collected while keeping the tokens as mere valueless symbols when they gather enough investment. They remove all the funds from the liquidity pools or the treasury of the project. Rug pulls rely on people's faith and enthusiasm in new DeFi projects, specifically, they use the hope for quick and big earnings, as well as advanced technologies.<sup>368</sup> While the fake wallets and exchanges constitutes to be an another type in which the fraudsters devise fake platforms that look quite genuine but are only intents on ripping people off of their money. Such fake wallets may work like a genuine wallet from time to time but, in the long run, it will drain any deposited cryptocurrencies. Likewise, fake exchanges enable the users to buy and sell the cryptocurrencies for some time, but they later stop the withdrawal process and abscond with the users' money. These are fake businesses that mimic legitimate ones and the majority usually incorporate professional looking websites and marketing strategies to collect the victims' money.

In conclusion, it can be stated that all the above-listed crypto frauds and scams use the specificity, novelties, and peculiarities of cryptocurrencies, which are inherent in these digital assets, in order to victimize the innocent people. Be it the Ponzi schemes and fake Initial Coin Offerings or the phishing attacks, pump-and-dump schemes, rug pulls, fake wallets, and exchanges, all these kinds of scams exploit some weakness of the novel cryptocurrency space. While conning people and making them lose their hard-earned money, these scams also bring discredit to the virtue of the cryptocurrency market, thus becoming a nightmare for both the regulators and other genuine users. Hence, there exists a dire need to enhance the awareness, enhance on security and more effective regulations for investors to gain confidence and make the cryptocurrency environment a more secure and reliable place.

---

<sup>368</sup> *Rug Pull*, COIN MARKET CAP (Aug. 21, 2021, 05:47 AM), <https://coinmarketcap.com/academy/glossary/rug-pull>.

## Case Studies

### 1. Bitconnect:

As a matter of fact, out of all the hated scams in the crypto sector, one cannot fail to mention the infamous ponzi scheme by the Bitconnect. Bitconnect is among the most famous Ponzi scams that hit the world of cryptocurrencies.<sup>369</sup> Starting in 2016, bitconnect offered investors 7% to 8% daily returns from a ‘trading bot’ and a ‘volatile software,’ the pair of which were said to make profits based on Bitcoin fluctuating prices. Lenders had to buy BCC using BTC and then lend BCC to the platform in exchange for daily interest income. The given interest rates were thought to be extremely high and these rates started from 1% per day and hence more people invested in it. In January 2018, bitconnect announced that it was closing its lending and exchange service as it received regulatory warnings and constant negative news. This led to panic sales and before anyone knew it, the BCC was worth less than \$1 from what could be selling at about \$400. The investigations later showed that bitconnect was a mere pyramid/ ponzi scheme that paid its early investors using the funds of the later investors. The failure led to the investors loses that were estimated to be above \$1 billion across the globe. Legal actions were initiated against the promoters and several of them has faced the charges of securities fraud and unlicensed money transmitting business.

### 2. OneCoin: The Multi-Billion Dollar Scam

OneCoin, created in 2014 by Ruja Ignatova, was developed as a new-generation currency that was projected as if it would be superior to Bitcoin. It involved multi-level marketing (MLM) with the assistance of which people could earn great money by selling educational products containing OneCoin tokens. OneCoin sold itself through a network of distributors who bring in new subscribers and receive payment for it. They offered educational packages starting

---

<sup>369</sup> David Voreacos, *BitConnect Promoter Gets 38 Months in \$2.4 Billion Ponzi Scam*, BLOOMBERG (Sept. 17, 2022, 08:25 AM), <https://www.bloomberg.com/news/articles/2022-09-17/bitconnect-promoter-gets-38-months-in-2-4-billion-ponzi-scam>.

at hundreds of euros and going up to tens of thousands of euros which were called for the provision of financial education and OneCoin tokens. However, it was found that this cryptocurrency, OneCoin, had no blockchain and was priced as the company deemed fit. OneCoin was brought under scrutiny by the authorities by the end of year 2017, which exposed it as a complete scam.<sup>370</sup> Ruja Ignatova has not been seen since 2017 and is still on the run, while her brother and other accomplices were arrested and accused of embezzlement and fraud. According to the reports, OneCoin, for instance, is reported to have defrauded investors of about \$4 Billion. The case is significant by the fact that it involves huge amounts of money and the unidentified mastermind behind the scheme who is popularly known as the Cryptoqueen.

### 3. PlusToken: The \$2 Billion Exit Scam

PlusToken was introduced to be as a high-yield investment program (HYIP) that started in 2018, which promised very high profits based on a cryptocurrency wallet service and trading using funds from members.<sup>371</sup> PlusToken lured investors into the platform with high daily returns and the participants were supposed to deposit their cryptocurrency with the PlusToken wallet. It also had a system of introducing new investors where the existing investors would be paid commission for bringing in the new investors, which is more of a pyramid scheme. It was in mid-2019 when users started to experience problems when they tried to withdraw their funds, which prompted them to suspect that the company was a scam. Soon after that, the PlusToken team disappeared, and it was discovered that the con artists had cashed out having stolen over \$2 billion worth of

---

<sup>370</sup> *Co-Founder of Multibillion-Dollar Cryptocurrency Scheme "OneCoin" Sentenced To 20 Years In Prison*, UNITED STATES ATTORNEY'S OFFICE, SOUTHERN DISTRICT OF NEW YORK (Sept. 12, 2023), <https://www.justice.gov/usao-sdny/pr/co-founder-multibillion-dollar-cryptocurrency-scheme-onecoin-sentenced-20-years-prison>.

<sup>371</sup> Sidney Leng, *Chinese cryptocurrency scam ringleaders jailed in US\$2.25 billion Ponzi scheme involving PlusToken platform*, SOUTH CHINA MORNING POST (Dec. 01, 2020, 07:15 PM), <https://www.scmp.com/economy/china-economy/article/3112115/chinese-cryptocurrency-scam-ringleaders-jailed-us225-billion>.

cryptocurrencies. Chinese authorities later arrested some individuals associated with PlusToken but most of the stolen money was not regained.

#### 4. BitPetite: The Disappearing Act

BitPetite was an online investment site that purported to earn its investors through cryptocurrency blending services. It started in mid-2017 and immediately gained popularity because of its high profit investment schemes. BitPetite offered its users a daily yield of up to 4% on investments, stating that the profits were generated from the mixing service that the company provided, which helped users to anonymize their cryptocurrency transactions. People could invest in Bitcoin, Ethereum or Litecoin to earn daily, weekly or monthly profits. In November 2017, BitPetite ceased its operations and closed down all its platforms including the website and social media handles, and eventually leaving the investors without access to their money. What emerged was the realization that BitPetite was a ponzi scheme, with the minds behind the system absconding with the people's money.<sup>372</sup> While the precise sum stolen by the scam artists was never definitively determined, it was widely believed to be in the millions of dollars. The case also brought out factors such as the danger of high yield investment platforms and the need to conduct an authentic and comprehensive research.

#### 5. Fake ICOs: The Prodeum Case

While 2017 was the year of ICOs, where many genuine startups managed to attract funds but at the same time it was also the year for the scammers to take advantage of the prevailing trend. Such an ICO scam was Prodeum which was a fake blockchain-based venture in the sphere of agriculture.<sup>373</sup> Prodeum said that it was working on a

---

<sup>372</sup> Brian Nibley and Miranda Marquit, *Guide to Cryptocurrency Scams: How To Avoid Them*, NEWSWEEK VAULT (May 23, 2024 03:56 PM), <https://www.newsweek.com/vault/investing/cryptocurrency-scams/>.

<sup>373</sup> Becky Peterson, *A crypto startup that vanished and changed its website to the word 'penis' allegedly stole the identities of its team*, BUSINESS INSIDER (Jan. 30, 2018, 02:55 PM), <https://www.businessinsider.com/cryptocurrency-and-blockchain-startup-prodeum-pulled-an-exit-scam-2018-1>.

blockchain solution that would ensure consumers to get the accurate information about the produce which they were consuming from the time it was supposed to be harvested. The project shared a whitepaper and created an informative and credible site for investors to visit. In January 2018, shortly after its ICO, Prodeum disappeared from the web, and its website was replaced by the word 'penis'. This hoax ensured that anyone interested in investing in Prodeum knew that this was a completely fake company and the people behind it had no intention of creating a real product. The money lost in the Prodeum ICO was not a lot, but it was enough to provide a rather strong signal to investors about the dangers of investing in unverified projects.

The scammers and fraudsters in the Cryptocurrency market are many and are continually coming up with new styles of perpetrating their evil deeds due to the decentralized and anonymous nature of the Cryptocurrencies. The examples of BitConnect, OneCoin, PlusToken, BitPetite, and Prodeum are perfect ones, in order to show that how these schemes can expand internationally and deceive investors in billions of dollars. These episodes call for more scrutiny of cryptocurrencies by regulators, more awareness among investors and proper vetting of new coins in the market. While it is still in its developing stage, the efforts towards minimizing the incidences of frauds and scams involving cryptocurrencies are vital to safeguard the investors and to retain confidence in the future of cryptocurrencies. Law enforcement agencies and the blockchain community should find ways and means of enhancing security measures as well as implementing regulations that will effectively prevent such crimes and promote the proper use of cryptocurrencies in the financial market.

## **2. Money Laundering in Cryptocurrencies**

Money laundering involves the concealment of the source of funds which are considered to have been gotten through illegitimate means by the transfer via foreign banks or through business entities. Due to the characteristics of the anonymity, decentralization, and the lack of the border control of cryptocurrencies, they have become objects of interest for the money mule. Cryptocurrencies allow for the fast movement of large amounts of funds across borders and with the

relative obscurity and it is a severe challenge for the authorities and the police forces around the world. Money laundering process in cryptocurrency involves a complex set of schemes and phases that are intended to remove the link between the offender and the criminal proceeds.<sup>374</sup> This process is said to have three main phases such as placement, layering and integration and this takes the advantage features such as anonymity, portability and decentralization that come with cryptocurrencies alongside.<sup>375</sup> All the stages are crucial in the process of turning the black money into what appears to be as legitimate investments.

The first stage, that is the stage of placement, involves depositing the ill-gotten cash into the financial system without declaring the source of the money. In the context of cryptocurrencies, this usually involves the exchange of fiat money, which is often directly associated with illegitimate activities. This conversion can happen in a number of ways, for example, through the use of the available cryptocurrencies platforms such as the exchanges. These are the points where cash or bank transfer is used to purchase cryptocurrencies like Bitcoin, Ethereum or any other altcoin. At this stage, there could be instances where multiple small transactions would be made to avoid the detection process and this is called as 'smurfing.' The Peer-to-Peer (P2P) exchange could also be used here, since transactions occur between the individuals and generally not between an individual and a business, as this may raise suspicion in the highly regulated areas.

The layering stage is the most crucial and complicated stage of the money laundering process as it involves the movement and integration of the proceeds into other sources of funds. Here, the goal is to cover the source of the funds by integrating a series of transactions. Launderers transpose the cryptocurrency through many wallets, exchanges, and cross different cryptocurrencies with each

---

<sup>374</sup> *Money laundering through cryptocurrencies*, UN TOOLKIT ON SYNTHETIC DRUGS, <https://syntheticdrugs.unodc.org/syntheticdrugs/en/cybercrime/laundryingproceeds/moneylaundering.html> (last visited July 08, 2024).

<sup>375</sup> David Grau, *What Law Enforcement Needs to Know About Crypto Money Laundering*, COGNYTE (Aug. 08, 2023), <https://www.cognyte.com/blog/anti-money-laundering-cryptocurrency/>.

other. These services group several transactions from different users into one pool and then relay them, technically it becomes nearly impossible to identify individual money sources thereafter. Furthermore, the launderers could use new-generation cryptocurrencies such as Monero or Zcash that provide even greater anonymity than Bitcoin.<sup>376</sup> Another layering strategy entails moving the funds through DEXs since they have low to moderate KYC measures as compared to their centralized counterparts. The goal is to establish a network of transactions that may not be easily traced to its source, thus making it difficult for the authorities to freeze the funds.

The last process of money laundering is the integration stage, whereby the money is returned into the legal economy without any trace of its illegal source. This can be achieved in the following manner. One is to sell the cryptocurrency back to fiat currency through exchanges that may not be very regulated or directly approachable over the counter brokers. The laundered funds could also be spent on expensive assets like property, cars, or other valuables that could be resold to lend the money in a more legitimate cover. Occasionally, the laundered money may be channeled through purchasing stakes in companies or organizations, newly-formed companies or other entities, whose revenue can then be considered as genuine income. This stage is important because it offers a yardstick on how the illicit cash can be reintroduced into the economy without being detected.

In the aforementioned stages, the decentralization and anonymity of cryptocurrencies remain as some of the major threats and difficulties to the law enforcement and regulating authorities. Some of the common anti-money laundering (AML) mechanisms are not effective to address in combating the cryptocurrency transactions because of its very high velocity and geographical boundaries.<sup>377</sup> Therefore, regulators are always responding, and the

---

<sup>376</sup> Chainalysis Team, *Crypto Money Laundering: Four Exchange Deposit Addresses Received Over \$1 Billion in Illicit Funds in 2022*, CHAINALYSIS (Jan. 26, 2023), <https://www.chainalysis.com/blog/crypto-money-laundering-2022/>.

<sup>377</sup> *Anti-money Laundering (AML) in Cryptocurrency*, ELLIPTIC, <https://www.elliptic.co/anti-money-laundering-aml-in-cryptocurrency> (last visited July 08, 2024).

latest trend is to apply even harsher KYC and AML policies to the exchanges and other crypto services. However, due to the structure of cryptocurrencies and the anonymity of accounts, it is clear that new methods and technologies will always be required to deal with more complex money laundering techniques. Money laundering is intentional and systematic in the case of cryptocurrencies, which allows those who use them to mask the illicit source of funds by exploiting the anonymity, portability, and decentralization of cryptocurrencies. It may be reasonably concluded that the placement process, layering process and the integration process, makes it clear that money laundering is a complex process that poses a lot of difficulty in tracing the proceeds back to the legitimate sourced it is a factor that makes it a challenge for the regulators and the law enforcement agencies to deal with. Overcoming these challenges calls for constant updates of regulatory systems, improved cooperation between nations, and the introduction of new technologies that would help in the identification and prevention of money laundering in cryptocurrencies.

Money laundering in cryptocurrency involves the use of complex methods that conceal the identities of the criminals as well as the identities of the transactions. These techniques leverage the specifics of cryptocurrencies, namely anonymity and decentralization, to add one more layer of obfuscation that hinders the work of regulators and police. Some of the techniques are mixers and tumblers, privacy coins, chain hopping, and Decentralized Exchanges. There are many tools used in money laundering involved in the crypto space, but the most common are Mixers and Tumblers.<sup>378</sup> These services function by combining numerous transactions into one bundle so that coins from various users are grouped together and dispersed in a manner that does not allow tracking back to the source. Mixer service is a process through which, when a user sends cryptocurrency to a specific address, the service mixes the cryptocurrency with those by other users, thus eliminating the direct correlation between the sender and the receiver. It clearly minimises the transaction history, so it will be

---

<sup>378</sup> Merkle Science, *Mixers and Tumblers: Regulatory Overview and Use in Illicit Activities*, MERKLE SCIENCE (Feb. 18, 2022, 07:00 AM), <https://knowledgebase.merklescience.com/technologies/mixers-and-tumblers>.

very hard to track the sources of the funds. These tumblers often come with a price for the service, and more complex mixers use complex algorithms to provide extra anonymity. Even though people have a right to privacy and might use these services legally but generally most of the times these services are used by criminals, who try to clean their money got from hacking, frauding, and drug dealing.

There are even advanced privacy-oriented coins such as Monero, Zcash, and Dash that have been developed to offer users with higher levels of anonymity.<sup>379</sup> These cryptocurrencies have integrated complex features of cryptography to mask the identities of the transactions, including the sender and receiver addresses as well as the transaction amounts. For example, ring signatures and stealth addresses are employed in Monero, so that it is impossible to trace the sender or receiver of money. Zcash allows users the shielded transaction which means that the data of the transaction is encrypted, while Dash has a feature that has been termed as PrivateSend that helps in mixing the transaction. Such features make such coins very appealing to anyone who wishes to avoid scrutiny when conducting business, and as such, they are often linked to money laundering. In addition, Chain Hopping can require shifting of funds from one cryptocurrency to another and from one exchange to another in a way that makes it hard to trace the funds.<sup>380</sup> This is because through the process of exchanging one cryptocurrency to another, the criminals bring in other layers of transactions that are hard to trace. Every conversion and transfer between various blockchains adds more layers of complexity to the process, which complicates the work of investigation and makes it difficult to find links back to the original criminal source of funds. Chain hopping is associated with decentralized exchanges (DEXs) and other platforms that have limited regulation, which makes it even harder to track such transactions. This technique leverages the fact that there are many

---

<sup>379</sup> Arda Akartuna, *Five ways coin swap services facilitate money laundering and sanctions evasion*, ELLIPTIC (Oct. 02, 2023), <https://www.elliptic.co/blog/five-ways-coin-swap-services-facilitate-money-laundering-and-sanctions-evasion>.

<sup>380</sup> Merkle Science, *Chain Hopping: The Future of Crypto Money Laundering*, MERKLE SCIENCE (July 06, 2023, 01:50 PM), <https://knowledgebase.merklescience.com/security-risk/chain-hopping-the-future-of-crypto-money-laundering>.

parties involved in the market and the fact that many of these parties are unregulated and operate discreetly.

Decentralized Exchanges, known as DEXs, enable transactions between the users without the involvement of an authority. In contrast to exchanges that often require users to go through KYC verification, DEXs allow trading without revealing the identities. This anonymity feature of DEXs makes them appealing for individuals looking to launder the money. The decentralized structure of these platforms eliminates a point of control or failure making it challenging for regulators to enforce rules and monitor the transactions effectively. Moreover the absence of KYC requirements on DEXs allows for transactions with limited oversight offering an easy route for money laundering activities.

In summary cryptocurrency money laundering involves methods to conceal the origins and movement of funds. Techniques like mixers and tumblers, privacy coins, chain hopping and decentralized exchanges all contribute to adding layers of complexity that pose challenges for regulators and law enforcement agencies. These strategies take advantage of cryptocurrency features such as anonymity and decentralization to facilitate the laundering process. As the cryptocurrency landscape advances, the appropriate authorities will need tools and collaborative approaches to effectively combat these laundering practices and reduce their potential impact on the financial system.

## Case Studies

### 1. The BTC-e Exchange Case

BTC-e is an example of one of the largest BitCoin trading platforms that started operating from 2011 up to its shut by the U. S. in 2017. They were accused of averting money laundering on a large scale, the site was processing dirty money originating from different illegal activities across the globe.<sup>381</sup> BTC-e adopted quite lenient rules

---

<sup>381</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, BTC-e Operator Pleads Guilty to Money Laundering Conspiracy (May 03, 2024), <https://www.justice.gov/opa/pr/btc-e-operator-pleads-guilty-money-laundering->

and regulation and that has made it the favourite platform of criminals for laundering the money. An user could easily operate an account with the modest identification and seamlessly transfer the fiat money to Bitcoin and other cryptocurrencies. It was involved in money laundering for a vast number of cybercrime-related transactions, with the Mt. Gox hack being one of the most prominent among them. In July 2017 the site was seized after its operator Alexander Vinnik was arrested in Greece. He was accused of laundering \$4 billion in Bitcoins over several years time. The US Justice Department accused him of running an unregistered money transmitting business, which involved money transmitting, money laundering and other crimes. He was later spotted in France and also bound to undergo further prosecution.

## 2. The Helix and AlphaBay Cases

Helix was an application to blend Bitcoin and AlphaBay was a black market place. Two of the platforms were used especially in the laundering of bitcoins. Owned and run by Larry Dean Harmon, it supplemented its Helix mixing services that obscurify Bitcoin transactions.<sup>382</sup> Helix served as an exchange for Bitcoins from 2014 to 2017 and it is reported to have monetarized over 350,000 Bitcoins, worth approximately \$300 million at that time. AlphaBay was a popular marketplace that wrapped up its operations recently and reported to be involved in sales of various illegal items including contraband drugs, weapons, and stolen credentials. Payments were made mainly in the form of bitcoins and monero, hence such privacy cryptocurrency hid their financial undertakings well. It was closed down in July 2017 in an operation involving law enforcement agencies from several countries by arresting the site's administrator, Alexandre Cazes, who was later found dead in his cell. However in February

---

conspiracy#:~:text=A%20Russian%20national%20pleaded%20guilty,world's%20largest%20virtual%20currency%20exchanges.

<sup>382</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, Ohio Resident Pleads Guilty to Operating Darknet-Based Bitcoin 'Mixer' That Laundered Over \$300 Million (Aug. 18, 2021), <https://www.justice.gov/opa/pr/ohio-resident-pleads-guilty-operating-darknet-based-bitcoin-mixer-laundered-over-300-million>.

2020, the young and talented Larry Dean Harmon was arrested for running Helix as money transmitting business and conspiracy to launder monetary instruments. These cases demonstrated the interconnected nature of illegal activities facilitated by cryptocurrencies and the global efforts required to dismantle such networks.

### 3. The Bitfinex Hack and Laundering Case

In August 2016, the Hong Kong-based major exchange known as Bitfinex was attacked, and hackers got away with about 120,000 Bitcoins.<sup>383</sup> In the years that followed, the stolen Bitcoins underwent several washing processes. The stolen funds were initially idle, but later started to be transferred from one Bitcoin address to another, though in small amounts to prevent attention. The launderers used techniques like chain hopping, mixers, and privacy coins to make the transactions untraceable. Some of the money was sent to several exchanges and they have been exchanged for other altcoins and cashed out with an aim of concealing the source of the funds. Ilya Lichtenstein and Heather Morgan were apprehended in February 2022 by the U. S. authorities for allegedly trying to launder the stolen Bitcoin(s). With the help of investigations of the blockchain and cooperation with exchanges, the police followed the movement of the stolen money. The arrests and the return of about \$3.6 billion worth of Bitcoin showed the possibility of using modern blockchain investigation methods to track unlawful actions.

### 4. The PlusToken Scam

PlusToken was a better return program that promised good returns to its investors. It was launched in 2018 and later discovered as one of the largest cryptocurrency scams. It promised daily returns to its investors through a trading bot and arbitrage trading. It successfully collected over \$2 billion in cryptocurrency from millions

---

<sup>383</sup> Dan Mangan and Eamon Javers, *Bitcoin launderer pleads guilty, admits to massive Bitfinex hack*, CNBC (Aug. 03, 2023, 06:03 PM), <https://www.cnbc.com/2023/08/03/new-york-man-admits-being-original-bitfinex-hacker-during-guilty-plea-in-dc-to-bitcoin-money-laundering.html>.

of customers. Operators move the fund through various laundering techniques such as mixers and chain hopping in order to dissemble their tracks. Chinese authorities arrested multiple individuals associated with PlusToken in 2019 and 2020.<sup>384</sup> But even after arrest, a prominent amount of stolen funds was still in circulation. This case underscored the scale of money laundering operations associated with major crypto scams and the international efforts required to track and recover the stolen assets.

## 5. The Silk Road Case

Silk Road was a dark-net marketplace that was established in 2011 by Ross Ulbricht also known as Dread Pirate Roberts. Silk Road's business was in the provision of an online black market where it sold prohibited goods and services and the main medium of exchange used therein was Bitcoins. Silk Road offered opportunities to purchase and sell prohibited goods without disclosing one's identity. The use of Bitcoin to make transactions on the site and the built-in mixing service made it almost impossible for the police to follow the flow of money. This allowed bitcoin to become a perfect medium for money laundering since its usage is anonymous. Silk Road was shut down by the FBI in October of 2013 and Ulbricht was arrested and subsequently sentenced to life in prison.<sup>385</sup> More than 144,000 Bitcoins were seized, which valued about \$28.5 million then. The case was a classic in showing that cryptocurrencies have the capability of facilitating and money laundering from criminal activities. It also pointed out the necessity of the international cooperation to fight against the crypto crimes as several international agencies were engaged in the operation.

Money laundering through cryptocurrencies is not that difficult due to some characteristics of cryptocurrency such as anonymity and

---

<sup>384</sup> Daniel Palmer, *Chinese Authorities Have Seized a Massive \$4B in Crypto From PlusToken Scam*, COIN DESK (Nov. 27, 2020, 04:05 PM), <https://www.coindesk.com/markets/2020/11/27/chinese-authorities-have-seized-a-massive-4b-in-crypto-from-plustoken-scam/>.

<sup>385</sup> Sam Frizell, *How the Feds Nabbed Alleged Silk Road Drug Kingpin 'Dread Pirate Roberts'*, TIME (Jan. 21, 2015, 07:00 AM), <https://time.com/3673321/silk-road-dread-pirate-roberts/>.

ability to conduct fast and borderless transactions. The examples of BTC-e, Helix and AlphaBay, the hack of Bitfinex, PlusToken, and Silk Road show that how individuals engage in money laundering and the scale of its effects on the international economy. The fight against cryptocurrency-related money laundering has become more active with respect to the regulators and the law enforcement turning to be more sophisticated across the borders.<sup>386</sup> However, as the techniques used in money laundering is dynamic and constantly adapts, hence constant monitoring, improvement in the methods used in regulating the cryptocurrency industry and the improvement of security measures within the cryptocurrency market is necessarily required. The illegal and illicit usage of cryptocurrencies highlights the importance of implementing a fair degree of regulation to maintain the integrity of the financial market without inhibiting development of this crypto space.

### 3. Crypto Theft & Hacking

Cryptocurrency theft and hacking are some of the most common and notorious crimes that have occurred in the digital currency market.<sup>387</sup> These activities include hacking into the users' wallets, exchanges and networks to embezzle the cryptocurrency funds. As most cryptocurrencies are decentralized and utilize pseudonyms, therefore the funds are often hard to recover after they have been stolen, thus making these crimes lucrative to the hackers. Crypto theft and hacking are built on the specific features of digital assets as an object of illicit activities, including anonymity, irreversibility of transactions, high cost, and globalization of the digital economy. Cryptocurrencies enable anonymity by using the cryptographic addresses of the parties involved in a transaction, which makes it hard to recover the embezzled funds. Once a cryptocurrency transaction has been occurred then it cannot be reversed like the bank

---

<sup>386</sup> Helina Hilda, *Cryptocurrency Money Laundering Guide: Meaning, Risks & Prevention*, HYPER VERGE (Aug. 25, 2023), <https://hyperverge.co/blog/money-laundering-in-cryptocurrency-risks-prevention/>.

<sup>387</sup> Nathan Reiff, *Can Crypto Be Hacked?*, INVESTOPEDIA (May 11, 2024), <https://www.investopedia.com/articles/investing/032615/can-bitcoin-be-hacked.asp>.

transactions and that makes it almost impossible to retrieve the embezzled funds. This characteristic, combined with large market capitalization of the assets such as Bitcoin or Ethereum, make cryptocurrencies appealing to the hackers. Also, the decentralized and boundary-less feature of cryptocurrencies helps the criminals to work from any part of the world and attack exchanges, wallets, and individuals without any proper jurisdictional consideration, thus making it very difficult for the law enforcement agencies with respect to dealing such challenging matters.

Moreover, there are organized criminals who use different means to steal the crypto by using technical as well as non-technical approaches. Phishing is a common technique where the attacker sends e-mails, links to fake websites or messages in order to make the user to disclose their private key or the password to their wallets, thus allowing the attacker to steal their hard earned invested money. Another form of attack is to take advantage of security vulnerabilities in cryptocurrency exchanges, wallets, and blockchains. They may stem from software glitches, lack of security measures or from a flaw in blockchain system design. The catastrophic effects of these weaknesses are not hard to see as witnessed by high-profile breaches of Mt. Gox and Coincheck incidences among others that saw the loss of millions of dollars in cryptocurrencies space.

Malware and ransomware are powerful tools in the arsenal of the cybercriminals who generally or specifically targets cryptocurrencies.<sup>388</sup> Malware can infect users' devices by capturing the keystrokes or scanning for wallet information to steal cryptocurrencies directly. Ransomware, which encrypts a victim's data and demands payment for its release, often requests ransom in cryptocurrencies due to their anonymity and ease of transfer characteristics. This method has become a common practice in the high-profile ransomware attacks, further emphasizing the vulnerability of digital assets. Addressing these threats requires robust security measures, user education as well as awareness and international cooperation to enhance the resilience of the

---

<sup>388</sup> Press Release, Cybersecurity & Infrastructure Security Agency, Crypto Ransomware (Oct. 22, 2014), <https://www.cisa.gov/news-events/alerts/2014/10/22/crypto-ransomware>.

cryptocurrency ecosystem. As cybercriminals continue to innovate and exploit the evolving landscape of digital currencies, it is imperative to develop advanced tools and collaborative strategies to effectively combat these sophisticated laundering techniques and mitigate their respective impact on the holistic financial system.

Mt. Gox was one of the first and largest Bitcoin exchanges, handling about 70% of all Bitcoin transactions worldwide by early 2014. The exchange suffered a series of security breaches that led to the loss of a massive amount of Bitcoins. Hackers exploited security vulnerabilities in the Mt. Gox platform over several years by gradually siphoning off the Bitcoins. The exchange's poor security practices and lack of proper auditing facilitated these thefts. In February 2014, Mt. Gox announced that approximately 850,000 Bitcoins (worth around \$450 million at that time) had been stolen and it eventually led to its bankruptcy. The collapse had a profound impact on the cryptocurrency community and it highlighted the importance of robust security measures for the crypto exchanges. Years later, a portion of the stolen Bitcoins was recovered, but the majority remained missing and the legal proceedings related to the collapse continued.

In the conclusion, it can be said that the malware and ransomware are the significant threats of cybercriminals involved in cryptocurrencies.<sup>389</sup> Malware can compromise users' devices and record the keystrokes or look for the wallet data to steal cryptocurrencies on the spot. Normally ransomware encrypts a victim's data and demands payment for the decryption key and the attackers prefer getting paid in cryptocurrencies because of their decentralization and transferability. Using this method remains a routine in high-profile ransomware attacks, stressing the frailty of digital assets. Mitigating these threats demands proactive security, increasing user awareness, and collaboratively strengthening the cryptocurrency environment. Given the fact that the criminals are also changing and adapting to the new trends in cryptocurrency, hence it is the time to create more efficient instruments and cooperate

---

<sup>389</sup> *Mitigating malware and ransomware attacks*, NATIONAL CYBER SECURITY CENTRE (Feb. 13, 2020), <https://www.ncsc.gov.uk/guidance/mitigating-malware-and-ransomware-attacks>.

internationally in order to counter these subtle methods of money laundering and its influence on the financial system.

## Case Studies

### 1. The Mt. Gox Hack

Mt. Gox was one of the first and one of the largest Bitcoin exchanges through which processed approximately 70% of all bitcoin transactions by February of 2014. In this case the exchange was subjected to several hacks that saw it lose a huge quantity of the Bitcoins. Several years ago, hackers gained unauthorized access to Mt. Gox's platform and began to steal Bitcoins gradually. These thefts were made possible by the exchange's inadequate security measures and failure to conduct a thorough audit. In February 2014, Mt. Gox filed for bankruptcy after revealing that about 850,000 BTC or \$450 million at that point in time had been stolen. The events that unfolded had a significant effect on the cryptocurrency community, especially regarding the need for proper security protocols for exchanges. Years later, part of the Bitcoins was returned but most of it was not and the legal processes of the collapse remained.

### 2. The Coincheck Hack

For instance, in January of 2018, Coincheck a Japanese cryptocurrency exchange was one of the biggest cryptocurrency hacks of all time.<sup>390</sup> The use of NEM tokens which were equivalent to about of the amounts the company has lost, it has lost more than \$530 million because of their failure to observe the necessary security measures. In their attack, hackers managed to breach Coincheck's hot wallet in which large portions of NEM were kept safely. Coincheck used to keep most of their assets directly accessible via hot wallets and not cold storage and that has made them the ideal targets. Despite such a loss, Coincheck was able to reopen by offering much less compensation to the affected users from its own pocket. This incident

---

<sup>390</sup> Yoichi Tsuchiya & Naoki Hiramoto, *How Cryptocurrency Is Laundered: Case Study of Coincheck Hacking Incident*, 4 FORENSIC SCIENCE INTERNATIONAL: REPORTS (2021).

in Japanese history left a precedent for Japanese regulators to improve the security aspects and strict regulations.<sup>391</sup>

### 3. The Bitfinex Hack

To date, one of the most famous is the hack of the cryptocurrency exchange Bitfinex in August 2016, where they lost about 120,000 Bitcoins or about 72 million dollars at that time.<sup>392</sup> It emerged that the attackers took the advantage of a loophole in Bitfinex's security measure and that was a multi-signature wallet. However, gaps in the system's implementation led to the attackers being able to unfettered access to the funds. After the hack, Bitfinex also announced that it has stopped trading as well as the processing of withdrawal requests. Instead of restoring stolen bitcoins back to affected users, Bitfinex created BFX tokens which could be exchanged for an appropriate portion of iFinex, or paid back. After some time, Bitfinex was capable of buy back all the BFX tokens that it issued and has given back the trust of its customers. The hack pointed out that security should not be compromised at the expense of developing relatively new financial systems because some consequences are inevitable.

### 4. The DAO Hack

The DAO (Decentralised Autonomous Organisation) project was an initiative within the Ethereum blockchain ecosystem. Its goal was to establish a venture capital fund managed through contracts. Unfortunately in June 2016, the DAO fell victim to a hacker who took advantage of weaknesses in the contract code leading to the loss of 3.6 million Ether tokens (worth roughly \$70 million at that

---

<sup>391</sup> Sebastian Sinclair, *30 Charged in Japan With Trading \$96M of Crypto Stolen in Coincheck Hack*, COIN DESK (Jan. 22, 2021, 03:52 PM), <https://www.coindesk.com/policy/2021/01/22/30-charged-in-japan-with-trading-96m-of-crypto-stolen-in-coincheck-hack/>.

<sup>392</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, *Bitfinex Hacker and Wife Plead Guilty to Money Laundering Conspiracy Involving Billions in Cryptocurrency* (Aug. 03, 2023), <https://www.justice.gov/opa/pr/bitfinex-hacker-and-wife-plead-guilty-money-laundering-conspiracy-involving-billions>.

time).<sup>393</sup> Vulnerability in the DAO's code allowed them to drain the funds from the DAO's pool. The hacker was able to transfer a significant amount of Ether (ETH) over a period of time, due to the flaw which allowed him to request funds from the DAO while before the initial transaction was approved.

This DAO hack led to an intense debate within the Ethereum community. To mitigate the damage, the Ethereum blockchain underwent a hard fork, creating two separate chains and that are Ethereum (ETH) and Ethereum Classic (ETC). The hard fork reversed the hack by invalidating the stolen funds on the new Ethereum chain. The importance of rigorous code auditing and security practices in smart contract development was highlighted by this incident.

## 5. The Poly Network Hack

In August 2021, the decentralized finance (DeFi) platform Poly Network was hacked, which resulted in the theft of over \$600 million worth of various cryptocurrencies.<sup>394</sup> The hacker manipulated the transactions and transferred the assets to their own account by exploiting a vulnerability in Poly Network's smart contract. It involved the improper handling of access permissions in the contract's code. Notably, the hacker, who claimed to have exploited the vulnerability for fun and intended to highlight the security flaw, returned nearly all the stolen funds after negotiations with the Poly Network.<sup>395</sup> This incident demonstrated both the risks associated with DeFi platforms and the potential for ethical considerations to influence the behaviour of hackers. Poly Network as a result, worked

---

<sup>393</sup> David Siegel, *Understanding The DAO Attack*, COIN DESK (Jan. 14, 2023, 01:16 AM), <https://www.coindesk.com/learn/understanding-the-dao-attack/>.

<sup>394</sup> Tommaso Gagliardini, *The Poly Network Hack Explained*, KUDELSKI SECURITY (Aug. 12, 2021), <https://research.kudelskisecurity.com/2021/08/12/the-poly-network-hack-explained/>.

<sup>395</sup> Ryan Browne, *Nearly all of the \$600 million stolen in a huge crypto heist has been returned — but there's a catch*, CNBC (Aug. 13, 2021, 06:58 AM), <https://www.cnbc.com/2021/08/13/poly-network-hack-nearly-all-of-600-million-in-crypto-returned.html>.

with security firms to rectify the vulnerabilities and improve its security measures.

Cryptocurrency theft and hacking continue to be one of the most significant threats to digital currency. The high value and pseudonymous nature of cryptocurrencies, combined with the often insufficient security measures of exchanges and wallets, make them prime targets for cybercriminals. The case studies of Mt. Gox, Coincheck, Bitfinex, the DAO, and Poly Network demonstrate the diverse means and methods used by hackers and the profound impact these incidents can have on the industry. As the cryptocurrency market evolves, enhancing security protocols, adopting rigorous auditing practices and fostering cooperation between exchanges, developers, and regulators will be crucial in mitigating the risks associated with theft and hacking. The community can build a more resilient system in order to prevent any future occurrences by understanding the incidents which took place in the past and their respective underlying causes. This will ensure the sustainable growth of the cryptocurrency ecosystem in the longer run.

#### 4. Ransomware in Cryptocurrencies

Ransomware is one of the types of malicious software that is designed to block the access to a computer system or its data. As a matter of fact usually it is executed by encrypting the files and such process remains active until a ransom is paid.<sup>396</sup> This type of cybercrime has become more frequent and pervasive due to the rise of cryptocurrencies, which not only provide a convenient way but also a relatively anonymous method for extorting payments from the victims. Cryptocurrencies, particularly Bitcoin, are preferred by cybercriminals due to their nature of being decentralized and the difficulty in tracing transactions back to the lawbreakers or offenders. Ransomware attacks are usually characterized by their use of encryption, ransom demands, anonymity, and global reach and as a consequence it provides for a frequent threat to individuals and organizations across various sectors. The core mechanism of

---

<sup>396</sup> Kaspersky IT Encyclopedia, *Crypto-ransomware*, KASPERSKY (July 08, 2017), <https://encyclopedia.kaspersky.com/glossary/cryptomalware/>.

ransomware is encryption, where the malicious software encrypts the victim's files by rendering them inaccessible without a decryption key. Cryptocurrencies such as Bitcoin are usually demanded as a mode of payment due to their pseudonymous nature, which makes it challenging to trace and identify the perpetrators.<sup>397</sup> The widespread and worldwide reach of ransomware attacks means that they can impact any individual or organization worldwide, including many critical sectors such as healthcare, finance, and government that potentially leads to a widespread disruption and financial losses.

Additionally, phishing emails are a very common kind of attack, in which the attacker sends a forged (fake) email that looks legitimate but contains a malicious attachment or link.<sup>398</sup> These attachments or links install the ransomware at the time of opening of such said email and affect the user system. Another method is the use of Exploit Kits, which scan for weaknesses in operating systems or software and deliver the ransomware when found. Another typical attack method is through the Remote Desktop Protocol (RDP) where cybercriminals use weak or compromised RDP credentials to access a system in such a way that they could then execute ransomware on it. Drive-by-downloads also occur when a user visits the infected or malicious websites being infiltrated and downloads the ransomware without their knowledge.

The combination of these techniques and the inherent characteristics of ransomware creates an alarming cybersecurity threat. Encryption locks victims out of their data and a payment is demanded in the name of ransom for the access to be restored, while the use of cryptocurrency payments utilizes both to its advantage and generally they are the anonymity of crypto as well as the law enforcement typically not being able to track such ransomware transactions back to the original source. Whenever there is a

---

<sup>397</sup> David Carlisle, *Ransomware & crypto: The growing compliance challenge*, REUTERS (May 01, 2023, 11:37 PM), <https://www.reuters.com/legal/legalindustry/ransomware-crypto-growing-compliance-challenge-2023-05-01/>.

<sup>398</sup> Deeksha Somani, *Crypto Phishing Scam: What is it and how to stay safe from it*, TIMES OF INDIA (Jan. 18, 2024, 11:53 PM), <https://timesofindia.indiatimes.com/gadgets-news/crypto-phishing-scam-what-is-it-and-how-to-stay-safe-from-it/articleshow/106966731.cms>.

malicious software like Ransomware, which can harm on a worldwide scale due to pro-activeness and accessibility to the internet, it may be concluded that no sector may go untouched and its consequences could be severe and long-lasting. Combatting ransomware requires a heterogeneous as well as a mixed approach, which includes robust cybersecurity measures, user education to recognize phishing attempts, regular software updates to patch vulnerabilities and secure RDP configurations.<sup>399</sup> Furthermore, appropriate authorities and organizations need to develop comprehensive incident response plans to lighten and alleviate the impact of ransomware attacks and recover from them efficiently.<sup>400</sup>

## Case Studies

### 1. WannaCry Ransomware Attack

The WannaCry ransomware attack that happened in May 2017 was one of the most widespread and disruptive cyberattacks in history as it affected hundreds of thousands of computers across 150 countries.<sup>401</sup> It specifically aimed at machines running Microsoft Windows, by encrypting data and demanding ransom payments in Bitcoin. The EternalBlue exploit is one such instance where WannaCry exploited a vulnerability in Microsoft's SMB protocol and the same was earlier developed by the NSA and it got leaked by the Shadow brokers which is a hacking group. Once a system was infected, WannaCry quickly propagated across networks by encrypting the files and displaying a ransom note demanding payment in Bitcoin. The attack severely impacted a wide range of sectors which included healthcare sector, where the UK's National

---

<sup>399</sup> *Mitigating malware and ransomware attacks*, NATIONAL CYBER SECURITY CENTRE (Feb. 13, 2020), <https://www.ncsc.gov.uk/guidance/mitigating-malware-and-ransomware-attacks>.

<sup>400</sup> DEEP SECURE LTD, *A PRACTICAL GUIDE TO COMBATTING RANSOMWARE* (2020).

<sup>401</sup> Alex Hern and Samuel Gibbs, *What is WannaCry ransomware and why is it attacking global computers?*, THE GUARDIAN (May 12, 2017, 05:16 PM), <https://www.theguardian.com/technology/2017/may/12/nhs-ransomware-cyber-attack-what-is-wanacrypt0r-20>.

Health Service (NHS) experienced widespread disruption.<sup>402</sup> Microsoft then quickly released patches to repair the exploited vulnerability, but the damage had already been done. Estimated total damages ranged in the billions of dollars. While the incident underscored the need for robust cybersecurity measures and timely software updates, tracing the ransom payments proved challenging due to the nature of Bitcoin payments being pseudonymous.

## 2. NotPetya Ransomware Attack

The NotPetya ransomware attack in June 2017 initially appeared to be a ransomware campaign but it was later revealed that it was a cyberattack that was politically motivated.<sup>403</sup> Its primary target was Ukraine and it caused a widespread disruption to businesses and infrastructure. NotPetya spread through a compromised update to a popular Ukrainian accounting software, that was M.E.Doc. Once it got compromised then the malware encrypted the Master Boot Record (MBR) and in order to decrypt the files, the attackers or hackers demanded a ransom in Bitcoin. However, unlike typical ransomware, NotPetya's main objective was destruction rather than financial gain as the process of decryption was flawed by making file recovery impossible even if the ransom was paid. NotPetya caused significant damage worldwide which affected companies such as Maersk, Merck, and FedEx and led to billions of dollars in losses. The attack underscored the potential for ransomware to be used as a tool for cyberwarfare and it underscored the need for enhanced cybersecurity and incident response strategies. Despite efforts to trace the Bitcoin payments, identifying the perpetrators proved to be very complex.

---

<sup>402</sup> Dan Milmo, *NHS ransomware attack: what happened and how bad is it?*, THE GUARDIAN (Aug. 11, 2022, 09:21 PM), <https://www.theguardian.com/technology/2022/aug/11/nhs-ransomware-attack-what-happened-and-how-bad-is-it>.

<sup>403</sup> Andy Greenberg, *The Untold Story of NotPetya, the Most Devastating Cyberattack in History*, WIRED (Aug. 22, 2019, 05:00 AM), <https://www.wired.com/story/notpetya-cyberattack-ukraine-russia-code-crashed-the-world/>.

### 3. Ryuk Ransomware

Ryuk ransomware has been responsible for numerous high-profile attacks since its emergence in the month of August, 2018.<sup>404</sup> Since it targeted large organizations and demanded huge ransom payments, usually in Bitcoin, it makes the same one of the most profitable ransomware operations. Generally, the main source of Ryuk's access to networks is by phishing emails, malicious attachments or by exploiting the weak RDP credentials. Once Ryuk enters a network, it disables the system restore options, encrypts files and leaves a ransom note by demanding a Bitcoin payment. The ransomware is known for its stealthy operations and ability to bypass various security measures. Healthcare, education, and government are some of the range of sectors that Ryuk has targeted, leading to significant operational disruptions and financial losses. For example, in 2019, Ryuk's attacks on several U.S. hospitals resulted in cancelled surgeries and delayed medical treatments.<sup>405</sup> The high ransom demands and substantial damages have made Ryuk a top priority for cybersecurity firms and law enforcement agencies. Efforts to trace the Bitcoin payments and identify the operators have had limited success and as a consequence it highlighted the ongoing challenge of combating the issue of ransomware.

### 4. REvil (Sodinokibi) Ransomware

REvil, also referred to as Sodinokibi, is a ransomware-as-a-service (RaaS) operation that has been active since April 2019.<sup>406</sup> Numerous high-profile attacks, including those on JBS, the world's largest meat processing company, and Kaseya, an IT management company, have been connected to it. REvil operates through the affiliates who spread the ransomware and share the ransom payments

---

<sup>404</sup> *What Is Ryuk Ransomware? A Detailed Breakdown*, SENTINEL ONE (July 16, 2021, 07:57 PM), <https://www.sentinelone.com/cybersecurity-101/ryuk-ransomware/>.

<sup>405</sup> Lily Hay Newman, *Ransomware Hits Dozens of Hospitals in an Unprecedented Wave*, WIRED (Oct. 29, 2020, 03:17 PM), <https://www.wired.com/story/ransomware-hospitals-ryuk-trickbot/>.

<sup>406</sup> *What is REvil ransomware?*, NOMIOS (Mar. 02, 2021), <https://www.nomios.com/resources/what-is-revil-ransomware/>.

with the core group. It acquires access to networks with the help of phishing, exploit kits, and compromised managed service providers (MSPs). Once it enters a network, REvil encrypts files and demands ransom payments either in Bitcoin or Monero. The group is known for using double extortion tactics, where they threaten to release the stolen data in case ransom is not paid. JBS was forced to shut down several meat processing plants and it resulted in the disruption of the food supply chain in May 2021, due to the REvil attack on JBS. In July 2021, the attack on Kaseya affected numerous businesses globally due to the compromised IT management software. These incidents highlighted the broad impact which the ransomware can have on critical infrastructure and the supply chains.

## 5. DarkSide Ransomware

An attack on the Colonial Pipeline in May 2021 by a ransomware group recognised as the DarkSide made it gain notoriety, which led to widespread fuel shortages in the southeastern United States.<sup>407</sup> The strategies that Darkside employs to gain access to networks include phishing, exploiting software vulnerabilities and using stolen credentials.<sup>408</sup> Once it gains the access, DarkSide encrypts files and demands ransom payments in Bitcoin. A double extortion model is operated by the group, threatening to publish stolen data if the ransom is not paid. Due to the Colonial Pipeline attack, the company was forced to shut down its operations temporarily, which caused a significant disruption to fuel supply and sparked public concern over cybersecurity vulnerabilities in the critical infrastructure. Colonial Pipeline paid a ransom of 75 Bitcoins (approximately \$4.4 million) to regain the access to their systems. However, U.S. law enforcement agencies later were able to retrieve a portion of the ransom. The attack highlighted that how important it is to protect the infrastructure against ransomware and prompted

---

<sup>407</sup> Press Release, Cybersecurity & Infrastructure Security Agency, DarkSide Ransomware: Best Practices for Preventing Business Disruption from Ransomware Attacks (May 11, 2021), <https://www.cisa.gov/news-events/cybersecurity-advisories/aa21-131a>.

<sup>408</sup> *DarkSide Ransomware Operations*, SISA (Sept. 28, 2021), <https://www.sisainfosec.com/blogs/darkside-ransomware-operations/>.

increased regulatory scrutiny and investment in cybersecurity measures.

Ransomware attacks leveraging cryptocurrencies have become a major danger to individuals, businesses and critical infrastructure worldwide. The WannaCry, NotPetya, Ryuk, REvil, and DarkSide cases depict how ransomware groups are evolving their tactics and the serious impacts of these attacks. Cryptocurrencies' inherent anonymity and ease of transfer make them attractive for extorting payments by challenging law enforcement and cybersecurity professionals to develop effective counter measures.<sup>409</sup> In the battle against ransomware, the need for robust cybersecurity practices, regular software updates, employee training and international cooperation cannot be overstated. With the evolving landscape of cybercrime, the strategies and technologies employed to combat these sophisticated threats, must also evolve while ensuring resilience and security in the digital age.

## 5. Darknet Markets in Cryptocurrencies

Darknet markets are online marketplaces that operate on the dark web and can be generally accessed only through specialized software like Tor (The Onion Router) that ensures anonymity for both buyers and sellers.<sup>410</sup> These markets often barter in goods and services that are unlawful, including drugs, weapons, counterfeit currency, stolen data and illicit pornography. The anonymous nature of Cryptocurrencies, particularly Bitcoin, and their ease of cross-border transactions makes them a preferable medium of exchange on these platforms.<sup>411</sup> Darknet markets, primarily known for facilitating illicit activities are characterized by their emphasis on anonymity, use

---

<sup>409</sup> Medha Singh, *Crypto ransom attack payments hit record \$1 billion in 2023 – Chainalysis*, REUTERS (Feb. 08, 2024, 02:48 AM), <https://www.reuters.com/technology/cybersecurity/crypto-ransom-attack-payments-hit-record-1-billion-2023-chainalysis-2024-02-07/>.

<sup>410</sup> The Investopedia Team, *What Is Tor? Who Uses It, How to Use It, Legality, and Purpose*, INVESTOPEDIA (Sept. 23, 2022), <https://www.investopedia.com/terms/t/tor.asp>.

<sup>411</sup> *Darknet Market*, HUDSON INTELLIGENCE, <https://www.fraudinvestigation.net/cryptocurrency/tracing/darknet-market> (last visited July 08, 2024).

of cryptocurrencies, trade in illegal goods and services and application of reputation systems. Anonymity is of supreme importance in darknet markets due to the tools like Tor and cryptocurrencies, which makes it difficult for law enforcement agencies to track and identify participants. Bitcoin is one of the most frequently used cryptocurrencies, though privacy-focused alternatives like Monero are gaining traction due to their enhanced anonymity features.<sup>412</sup> These markets act as platforms for the trade and exchange of illicit goods and services, ranging from drugs and counterfeit items to hacking tools and stolen data and it creates a shadow economy that operates beyond the reach of traditional law enforcement.

Various techniques and methods are employed by the darknet markets in order to maintain the element of secrecy and security. Encryption is utilized to safeguard the communications and transactions while ensuring that the identities of users remains protected. Multi-signature transactions enhance the layer of security by requiring multiple keys to authorize a transaction which as a result reduces the risk of fraud and provides assurance to both the parties involved. Escrow services further mitigate the risk by holding funds in escrow account until the buyer receives and confirms the receipt of goods. In addition, tumblers and mixers are utilized to obfuscate the transaction trail of cryptocurrencies, which acts as a hurdle for investigators to trace funds back to their origin, thus enhancing the anonymity of transactions within these markets. Reputation systems play a crucial role in darknet markets, akin to those found on legal e-commerce platforms. Trust is built by the vendors with buyers by maintaining positive feedback and delivering goods and services as promised. These systems not only help buyers make informed decisions but also mitigate the risk of scams or fraudulent activities. However, darknet markets remain a focal point for illegal activities, despite these security measures, posing significant challenges to law enforcement agencies worldwide. To combat darknet markets the efforts require a combination of many variables such as technological solutions, international cooperation, and targeted enforcement

---

<sup>412</sup> *What is the Darknet and what does it have to do with Bitcoin?*, BITPANDA (Oct. 09, 2019, 09:08 AM), <https://www.bitpanda.com/academy/en/lessons/what-is-the-darknet-and-what-does-it-have-to-do-with-bitcoin>.

strategies to disrupt their operations and hold the perpetrators accountable. One of the ongoing challenges for law enforcement and regulatory authorities is to address the complexities of the darknet, as the digital landscape continues to evolve.

## Case Studies

### 1. Silk Road

Silk Road was one of the first and most notorious darknet markets, launched in February 2011 by Ross Ulbricht, who operated under the pseudonym "Dread Pirate Roberts." Silk Road facilitated the sale of illegal drugs, weapons, and other illicit goods.<sup>413</sup> It operated as an anonymous marketplace through Tor for anonymity and Bitcoin for the transactions.<sup>414</sup> It offered a wide range of illegal products and services by leveraging a reputation system for vendors and using Bitcoin tumblers to obscure the financial trail. In October 2013, Ulbricht was arrested by the FBI and the site was shut down. He was later sentenced to life imprisonment without the possibility of parole. The seizure by the authorities included 144,000 Bitcoins, valued at approximately \$28.5 million at that time. The case underscored the potential for cryptocurrencies to facilitate illegal activities and the importance of the need for robust regulatory and enforcement mechanisms.

### 2. AlphaBay

AlphaBay was a major darknet market that emerged after the shutdown of Silk Road. Launched in 2014, it quickly became the largest darknet marketplace by offering a wide array of illicit goods and services.<sup>415</sup> AlphaBay used Tor for anonymity and accepted Bitcoin, Monero and Ethereum for the transactions purpose. It featured an escrow system to protect buyers and sellers, as well as a

---

<sup>413</sup> FRIZELL, *supra* note 42.

<sup>414</sup> TOR, *supra* note 67.

<sup>415</sup> *AlphaBay: How seven countries worked together to take down the biggest online black market for drugs*, U.N. OFFICE ON DRUGS AND CRIME, <https://www.unodc.org/unodc/en/untoc20/truecrimestories/alphabay.html> (last visited July 08, 2024).

reputation system to build trust among its current and intended users. In July 2017, AlphaBay was taken down by an international law enforcement operation and its alleged founder, Alexandre Cazes, was arrested in Thailand.<sup>416</sup> Cazes was found dead in his prison cell shortly after his arrest. The takedown of AlphaBay was a significant victory for law enforcement and highlighted the importance of international cooperation in combating the darknet markets.

### 3. Hansa Market

Hansa Market was another prominent darknet marketplace that gained popularity after the closure of AlphaBay. Launched in 2015, it offered a similar range of illicit goods and services. Hansa Market used Tor and accepted Bitcoin and Monero for the transactions. It featured strong security measures including multi-signature transactions and an escrow system to protect user anonymity and facilitate the trade. In July 2017, just days after the AlphaBay takedown, Dutch law enforcement, in coordination with Europol, seized control of Hansa Market.<sup>417</sup> However, instead of immediately shutting it down, they operated it for a month for the purpose of data collection with respect to its users and vendors and subsequently it led to numerous arrests. This strategic move demonstrated innovative law enforcement tactics in the fight against darknet markets.

### 4. Dream Market

Dream Market was one of the longest-running darknet markets operating from 2013 until its closure in 2019. It filled the void left by previous market closures by offering a variety of illegal goods and services. Dream Market used Tor for anonymity and accepted Bitcoin, Bitcoin Cash, and Monero for transactions. It maintained an escrow system, vendor reputation ratings, and offered various security

---

<sup>416</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, AlphaBay, the Largest Online 'Dark Market,' Shut Down (July 20, 2017), <https://www.justice.gov/opa/pr/alphabay-largest-online-dark-market-shut-down>.

<sup>417</sup> Andy Greenberg, *Operation Bayonet: Inside the Sting That Hijacked an Entire Dark Web Drug Market*, WIRED (Mar. 08, 2018, 11:38 AM), <https://www.wired.com/story/hansa-dutch-police-sting-operation/>.

features to protect its users. In March 2019, Dream Market announced its impending shutdown.<sup>418</sup> While the specific reasons were unclear, there was speculation about the increased law enforcement pressure and potential exit scams. Its closure marked the end of one of the most resilient darknet markets and reflected the ongoing efforts of authorities to disrupt these illegal platforms.

## 5. Wall Street Market

Wall Street Market was a significant darknet marketplace that operated from 2016 until its shutdown in 2019.<sup>419</sup> It became one of the largest markets following the closures of AlphaBay and Hansa. Wall Street Market used Tor for anonymity and accepted Bitcoin and Monero for transactions. It featured an escrow system, vendor reputation ratings, and robust security measures to ensure user privacy and transaction integrity. In April 2019, the German authorities in cooperation with Europol and law enforcement agencies from the United States and the Netherlands took down the Wall Street Market.<sup>420</sup> Several administrators and high-profile vendors were arrested. The authorities seized servers, cryptocurrency wallets and large amounts of cash, drugs and weapons. The said takedown further emphasized the effectiveness of international cooperation in dismantling the darknet markets and highlighted the ongoing battle against cybercrime facilitated by cryptocurrencies.

Darknet markets have leveraged the anonymity and security features of cryptocurrencies to facilitate the trade of illegal goods and services on a global scale. The case studies of Silk Road, AlphaBay, Hansa Market, Dream Market and Wall Street Market illustrate the

---

<sup>418</sup> P.H. Madore, *Dream Market Shuts Down: Has the DEA Claimed Another Darknet Victim?*, CCN (Apr. 21, 2023, 01:56 AM), <https://www.ccn.com/dream-market-shuts-down-has-the-dea-claimed-another-darknet-victim/>.

<sup>419</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, *Three Germans Who Allegedly Operated Dark Web Marketplace with Over 1 Million Users Face U.S. Narcotics and Money Laundering Charges* (May 03, 2019), <https://www.justice.gov/opa/pr/three-germans-who-allegedly-operated-dark-web-marketplace-over-1-million-users-face-us>.

<sup>420</sup> Brian Barrett, *179 Arrested in Massive Global Dark Web Takedown*, WIRED (Sept. 22, 2020, 12:57 PM), <https://www.wired.com/story/operation-disruptor-179-arrested-global-dark-web-takedown/>.

evolution of these platforms, their operational tactics and the challenges they pose to the law enforcement agencies and authorities. While cryptocurrencies have enabled the significant advancements in the financial technology but at the same time their use in darknet markets highlights the darker side of this innovation. The ability to conduct anonymous transactions and the global reach of these markets make them resilient and difficult to combat. However, the successes of law enforcement in taking down major markets and arresting the key figures demonstrate that with coordinated international efforts and advanced investigative techniques, significant progress can be made in addressing these illicit activities. The ongoing battle against darknet markets underscores the need for continuous improvement in cybersecurity, regulatory frameworks and international cooperation to mitigate the risks associated with cryptocurrency facilitated crimes. As the digital landscape evolves, it shall be mandatory to evolve the strategies and tools with a more rapid pace that are used to ensure the safety and security of both the legitimate as well as illicit aspects of the cryptocurrency ecosystem.

## 6. Terrorist Financing in Cryptocurrencies

Terrorist financing involves the provision of funds or financial support to individuals or groups engaged in terrorist activities.<sup>421</sup> This financing is crucial for maintaining the operations, acquiring weapons, recruiting members and executing the intended attacks.<sup>422</sup> Traditionally, terrorist groups have relied on various methods for funding, including donations, criminal activities, state sponsorship and front organizations. However, the advent of cryptocurrencies has introduced a new avenue for these groups to receive and transfer funds by leveraging the pseudonymous and decentralized nature of digital currencies to obscure financial trails and avoid the detection. Terrorist

---

<sup>421</sup> Soumya Awasthi, *Exploring the nexus: Cryptocurrency, Zakat, and terror funding*, OBSERVER RESEARCH FOUNDATION (May 08, 2024), <https://www.orfonline.org/expert-speak/exploring-the-nexus-cryptocurrency-zakat-and-terror-funding>.

<sup>422</sup> Reuters, *Crypto's role in terrorist financing*, REUTERS (Oct. 24, 2023, 12:50 AM), <https://www.reuters.com/technology/cryptos-role-terrorist-financing-2023-10-23/>.

financing in cryptocurrencies exhibits distinct characteristics that pose significant challenges to authorities and financial institutions. Anonymity is a key feature that enables the transactions to occur without revealing the identities of the parties involved. This anonymity makes it challenging for the authorities to trace funds and identify individuals or groups involved in terrorist activities. Additionally, cryptocurrencies facilitate quick and easy cross-border transfers bypassing traditional financial systems and controls. The decentralized nature of cryptocurrencies further complicates monitoring and enforcement efforts as there is no central authority that can monitor or block such blockchain based transactions and as a consequence it provides a layer of security for terrorism financiers. Moreover, the continuous evolution of cryptocurrencies and blockchain technology introduces new tools and techniques that can be exploited for terrorist financing and it will be presenting the ongoing challenges for law enforcement and regulatory agencies to a new all time high.

Various techniques are employed in terrorist financing using cryptocurrencies by leveraging the unique features of digital assets to fund the said illicit activities. Crowdfunding campaigns are utilized by terrorist groups to solicit donations in cryptocurrencies from sympathizers worldwide. This is generally done through the social media platforms and encrypted messaging channels.<sup>423</sup> Darknet markets provide a clandestine platform for purchasing weapons, fake documents and other resources using cryptocurrencies and as a conclusion it results in the generation of the revenue streams for the terrorist operations. Exploiting vulnerabilities in cryptocurrency exchanges and wallets is another tactic employed by terrorists to launder money and fund their activities. By exploiting weaknesses in security protocols, terrorists can move funds undetected which will further complicate the efforts to disrupt their financial networks.<sup>424</sup> Additionally, peer-to-peer transactions offer a discreet method of

---

<sup>423</sup> Varun V.M., *Prospects and Models of Combating Cryptocurrency Crimes*, 4 EUCRIM 365-370 (2023).

<sup>424</sup> Chainalysis Team, *Assessing Terrorism Financing On-chain is Crucial and Complex*, CHAINALYSIS (May 07, 2024), <https://www.chainalysis.com/blog/assessing-terrorism-financing-on-chain/>.

transferring funds directly between individuals and it usually makes them difficult to monitor and intercept by the appropriate authorities.

Addressing the challenges posed by terrorist financing in cryptocurrencies requires a multifaceted approach that combines regulatory measures, technological innovations and international cooperation. Enhanced monitoring and surveillance of cryptocurrency transactions along with improved cybersecurity measures are essential to detect and prevent illicit activities. Collaboration between governments, law enforcement agencies, financial institutions and cryptocurrency exchanges is critical to share the intelligence, identify emerging threats and implement effective counter measures.<sup>425</sup> Moreover, public awareness campaigns and efforts to promote the responsible cryptocurrency use can help mitigate the risks associated with terrorist financing and illicit activities in the digital asset space. As cryptocurrencies continue to gain prominence in the global financial landscape, hence addressing the nexus between cryptocurrencies and terrorism financing remains a pressing challenge for the international community.

## Case Studies

### 1. The Al-Qassam Brigades' Bitcoin Campaign

The Al-Qassam Brigades, the military wing of Hamas, has been known to use Bitcoin to finance its operations.<sup>426</sup> In early 2019, the group launched a fundraising campaign that solicited donations in Bitcoin. The Al-Qassam Brigades used their official website and social media channels to promote their Bitcoin addresses by encouraging the supporters to donate. The campaign provided detailed instructions on how to make anonymous Bitcoin donations including the use of mixing services to further obfuscate the transaction trail. The campaign raised significant funds and it

---

<sup>425</sup> Ali Rogin and Harry Zahn, *The role of cryptocurrency in financing terrorist organizations*, PBS NEWS (Nov. 04, 2023, 05:35 PM), <https://www.pbs.org/newshour/show/the-role-of-cryptocurrency-in-financing-terrorist-organizations>.

<sup>426</sup> Scott Glover and Curt Devine, *'They're opportunistic and adaptive': How Hamas is using cryptocurrency to raise funds*, CNN (Oct. 12, 2023, 10:54 PM), <https://www.cnn.com/2023/10/12/us/hamas-funding-crypto-invs/index.html>.

demonstrated the effectiveness of cryptocurrencies in facilitating terrorist financing. In August 2020, the U.S. Department of Justice (DOJ) seized millions of dollars' worth of cryptocurrency from accounts linked to the Al-Qassam Brigades, Al-Qaeda and ISIS, and disrupted these groups' financial networks.<sup>427</sup> The operation highlighted the need for enhanced monitoring and regulatory measures to combat the misuse of cryptocurrencies for the purpose of terrorist financing.

## 2. ISIS & The Use of Cryptocurrencies

The Islamic State of Iraq and Syria (ISIS) has been linked to several instances of using cryptocurrencies to fund its activities.<sup>428</sup> Although traditional methods of financing still dominate as cryptocurrencies merely offer an alternative that is harder to track. ISIS supporters have used social media and encrypted messaging apps to solicit Bitcoin donations. In one notable case, an ISIS-linked website provided detailed instructions on how to buy and donate Bitcoin anonymously. These efforts aimed to bypass the traditional banking systems and avoid the international sanctions. The use of cryptocurrencies by ISIS has prompted the increased scrutiny from the international law enforcement and regulatory bodies. The U.S. government has taken steps to track and disrupt these financial flows including the identification and seizure of cryptocurrency wallets linked to ISIS. These efforts have been a part of a broader strategy to weaken the financial infrastructure of terrorist organizations.

## 3. The Use of Cryptocurrencies by Al-Qaeda

Al-Qaeda which is one of the most infamous terrorist organizations, has explored the use of cryptocurrencies to support its

---

<sup>427</sup> Press Release, Office of Public Affairs, U.S. Department of Justice, Global Disruption of Three Terror Finance Cyber-Enabled Campaigns (Aug. 13, 2020), <https://www.justice.gov/opa/pr/global-disruption-three-terror-finance-cyber-enabled-campaigns>.

<sup>428</sup> Matthew Hill, *Islamic State Is Increasingly Using Crypto to Fund Africa Militant Goals*, BLOOMBERG (Mar. 11, 2024, 09:30 PM), <https://www.bloomberg.com/news/articles/2024-03-11/islamic-state-using-more-crypto-to-fund-africa-militant-goals>.

global network.<sup>429</sup> In July 2020, U.S. authorities dismantled a complex network of cryptocurrency accounts used by Al-Qaeda to fund its activities. Al-Qaeda operatives used a variety of methods to solicit and transfer funds in cryptocurrencies including online campaigns, social media platforms and encrypted messaging services. They further employed the mixing services and other techniques to obscure the origin and destination of the funds. The action resulted in authorities confiscating cryptocurrency assets worth of millions of dollars and terminating multiple internet-based fundraising efforts. The incident highlighted how terrorist groups can use new technologies to raise funds and it essentially underscores the importance of international cooperation to track and dismantle these financial networks.

#### 4. Hezbollah's Cryptocurrency Operations

Another militant organization which has also been accused of using cryptocurrencies for funding is the Hezbollah which is a Shiite group from Lebanon. In 2018 a Hezbollah fundraising campaign linked to the Hezbollah was found with a Bitcoin donation page.<sup>430</sup> The campaign shared links to their Bitcoin addresses and asked fans to further broadcast the address on other sites. The source revealed that Hezbollah operatives offered guidance on purchasing and transferring Bitcoin without any identification due to the virtual asset's pseudonymity characteristic. The campaign showed terrorists may use cryptocurrencies as a funding source and it reasonably proved that the outlawing of the practice is achievable but not eternal. Terrorist financing particularly through the use of cryptocurrencies such as Bitcoin has remained a concern for the authorities. It may be suggested that with efforts to regulate such activities, further

---

<sup>429</sup> David Voreacos, *Binance Lapses Let Hamas, ISIS, al-Qaeda Make Bitcoin Trades*, BLOOMBERG (Nov. 22, 2023, 04:30 PM), <https://www.bloomberg.com/news/articles/2023-11-22/binance-lapses-boosted-terrorists-hackers-sanctions-violators>.

<sup>430</sup> Jamie Crawley, *Hamas, Hezbollah Now Prefer Tron to Bitcoin: Reuters*, COIN DESK (Nov. 27, 2023, 06:36 PM), <https://www.coindesk.com/business/2023/11/27/hamas-hezbollah-now-prefer-tron-to-bitcoin-reuters/>.

cooperation between states and non-state actors in this fight against these threats is a sine qua non.

## 5. The Jihadist Telegram Campaigns

Different jihadist groups have employed encrypted messaging applications such as Telegram to request for digital currencies donations.<sup>431</sup> Such platforms create an opportunity to share the information and collect the funds securely as well as anonymously. Jihadist groups' open channels and groups in the Telegram operates to share the secret information and fundraising in cryptocurrencies. They offer clear guidelines on how to acquire and transmit cryptocurrencies by frequently employing several levels of encryption and anonymity measures to preserve the donors' and the recipients' identities. These campaigns have amassed a lot of funds for the terrorist activities and have made agencies of security and intelligence more alert. The fundraising through Telegram and other encrypted platforms is as good example and it has clearly shown that terrorist financing remains a dynamic process that requires constant counter action. The authorities and the IT industry have been partnering with each other in order to track and counter these platforms.

Cryptocurrencies in the financing of terror is one of the trends that threatens the world security more gravely. Cryptocurrencies' use of pseudonyms and decentralization makes the assets ideal for terrorists, who like to hide their financial dealings and avoid the conventional banking systems. The usage of cryptocurrencies in terrorist financing is described by the methods and techniques used in case of the Al-Qassam Brigades, ISIS, Al-Qaeda, Hezbollah and other jihadist groups. Measures to address such activities must therefore involve improvement of the legal environment, international collaboration and technology in monitoring and addressing the issues of money laundering among the others. Security agencies need to be proactive due to the dynamism of the terrorists and this requires them to employ conventional and innovative methods of investigations to give a strong check on the activities

---

<sup>431</sup> Laura Smith, *Messaging app Telegram centrepiece of IS social media strategy*, BBC (June 05, 2017), <https://www.bbc.com/news/technology-39743252>.

carried out by terrorists who use cryptocurrencies to facilitate their financing. With an increase in the use of cryptocurrencies, it is further important to shape the strategies and measures alongside involving all stakeholders identification of solutions against the misuse of crypto coins or tokens. This comprises enhancing the levels of communication, increasing the uptake of Know Your Customer (KYC) and Anti-Money Laundering (AML) practices and also enhancing the inter-country cooperation, since the problem is international in nature.

### **7.2.3 Global Response: How Authorities and Governments Combat Crypto Crimes**

With the augmentation in the use of cryptocurrencies, an increase in the criminal activities such as money laundering, terrorist financing, frauds, ransomware, theft, hacking and darknet markets associated with cryptocurrencies has also increased. Global leaders are playing a high stakes game of cat and mouse with the tech-savvy criminals. As the bad guys found the new clever ways to move the money around, the good guys are scrambling to keep up. It is not just about fancy laws and big police raids anymore as countries at the global stage are joining forces like never before via sharing intel and pooling resources. It is a constant battle of wits with the safety of ordinary folks hanging in the balance.

#### **United States**

In the US, multiple government bodies work together to tackle the crypto-related illegal activities. Each agency has its own set of responsibilities to create a thorough system of rules and oversight for the cryptocurrency space as defined under different laws.

#### **Financial Crimes Enforcement Network (FinCEN)**

Cryptocurrency exchanges are considered MSBs and must abide by the AML and KYC requirements as set forth by the FinCEN.<sup>432</sup>

---

<sup>432</sup> James Chen, *Financial Crimes Enforcement Network (FinCEN) Overview*, INVESTOPEDIA (Apr. 27, 2022), <https://www.investopedia.com/terms/f/fincen.asp>.

These peculiarities are described in detail in the 31 CFR § 1022. 210, where it is stated that MSBs must implement and maintain an AML program. Further, they require suspicious activity reports (SARs) in terms of part 1022 of title 31, Code of Federal Regulations, 1022. 320. Such regulations are crucial for tracking possible cryptocurrency associated illicit operations including money laundering and terrorism financing.

### **Securities and Exchange Commission (SEC)**

The Securities and Exchange Commission (SEC) regulates the Initial Coin Offerings (ICOs) and similar cryptocurrency based products to safeguard the investors and combat market fraud.<sup>433</sup> Digital assets categorized as securities must comply with federal securities laws, including registration requirements outlined in the Securities Act of 1933 and specific sections of the Securities Exchange Act of 1934. These offerings are also subject to Anti-Money Laundering (AML) program requirements detailed in 31 CFR § 1023. This regulatory framework aims to enhance transparency and reduce fraudulent activities in the cryptocurrency investment processes.

### **Commodity Futures Trading Commission (CFTC)**

The CFTC regulates the trading of cryptocurrencies and has set the rules concerning market manipulation and fraud.<sup>434</sup> The CFTC oversees the Commodity Exchange Act which deals with trading practices in order to maintain the market's integrity. Special rules on AML applicable to futures commission merchants and introducing brokers are provided in 31 CFR § 1026. 210. These actions are aimed at reducing the occurrence of fraudulent and manipulative practices in the sphere of cryptocurrency derivatives.

---

<sup>433</sup> James Chen, *Securities and Exchange Commission (SEC) Defined, How It Works*, INVESTOPEDIA (Apr. 16, 2024), <https://www.investopedia.com/terms/s/sec.asp>.

<sup>434</sup> The Investopedia Team, *Commodity Futures Trading Commission (CFTC) Overview*, INVESTOPEDIA (Sept. 26, 2021), <https://www.investopedia.com/terms/c/cftc.asp>.

## **Department of Justice (DOJ)**

The DOJ is not passive in its enforcement of cryptocurrency crimes and it uses the Bank Secrecy Act (31 U.S.C. §§ 5311-5314; 5316-5332) to regulate money laundering and other financial crimes. The DOJ works closely with FinCEN, the SEC, and the CFTC in conducting investigations and pursuing legal actions against offenders who use cryptocurrency to perpetrate crimes, fraud, or any other unlawful deeds.

In conclusion, these agencies form a coherent set of regulatory measures focused on the peculiarities of cryptocurrencies which strengthen the positions of the USA as transparent, secure and trusted in the sphere of digital assets.

## **European Union**

In response to the challenges posed by digital currencies, the EU has been at the forefront of creating comprehensive regulations. Their efforts which are majorly focussed upon enhancing market transparency, safeguarding consumers and strengthening oversight are exemplified by two major legislative actions and they are the Fifth Anti-Money Laundering Directive (5AMLD) and the proposed Markets in Crypto-Assets (MiCA) Regulation.

### **Fifth Anti-Money Laundering Directive (5 AMLD)**

The legal act in consideration that is officially termed as Directive (EU) 2018/843, also known as the 5AMLD sheds light on the EU's further enhancement of its measures to prevent criminal activities within the cryptocurrency market.<sup>435</sup> This directive expands AML and KYC rules to apply to exchanges and wallets of cryptocurrencies as well. Specifically, it mandates that these entities must ensure the following things:

---

<sup>435</sup> Katie Jackson, *The 5th anti-money laundering directive*, DELOITTE (Jan. 11, 2019), <https://www.deloitte.com/uk/en/Industries/financial-services/research/fifth-anti-money-laundering-directive.html>.

- Good and efficient AML and KYC policies for the purposes of identifying their customers and their activities for any unlawful activities.
- Make and preserve books of accounts for a minimum duration for transactions and customers as per the directive, etc.

Moreover, Article 1 of 5AMLD modifies Directive (EU) 2015/849- the Fourth Anti-Money Laundering Directive and brings under its ambit the subject matter of the virtual currency exchange platforms and custodian wallet service providers too. In this respect, they strengthen the level of transparency and accountability by applying the provisions of the 5AMLD which reduces the possibility of money laundering and financing of terrorism in the sphere of digital assets.

### 7.3 Markets in Crypto-Assets (MiCA) Regulation

The Markets in Crypto-assets (MiCA) Regulation is a legislative proposal by the European Commission that seeks to respond to the reality of the need for a harmonized legal framework for ICOs' issuance and trading in the EU.<sup>436</sup> MiCA covers various aspects of cryptocurrency regulation, including:

- **Consumer Protection:** The belief that they should be able to transmit data that can enable investors in decision making related to the crypto-assets. This includes for the issuers of crypto-assets that it should be mandatory to prepare an elaborative and comprehensive white paper.
- **Market Integrity:** Introducing techniques to prevent unsuitable application of markets is necessary if people trade on the insider's information and manipulate the market.

---

<sup>436</sup> *Markets in Crypto-Assets Regulation (MiCA)*, EUROPEAN SECURITIES AND MARKET AUTHORITY, <https://www.esma.europa.eu/esmas-activities/digital-finance-and-innovation/markets-crypto-assets-regulation-mica> (last visited July, 08, 2024).

- **Regulatory Oversight:** Expanding the information about supervision of the crypto asset activities. As a matter of fact, this also seems to be need of the hour in the ongoing advance event of the cryptocurrency and alike digital assets sector.

The purpose of the MiCA Regulation is to achieve the coherence of rules regarding financial tokens in the EU member states to remove legal loopholes.<sup>437</sup> The regulation also performs its criteria for the stablecoins and other developing token classes which would permit the regulation to modify with respect to the new tokens.

### 7.3.1 Asia

Several Asian countries have made progressive moves to address the use of cryptocurrencies, although the measures implemented in each of such countries has varied to mitigate the risk while embracing the promise that these digital assets offers. Japan shines in an active approach with respect to regulating cryptocurrencies and creating the necessary legal conditions. The Japanese Financial Services Agency (FSA) requires digital currency exchanges to enrol and follow the guidelines of Anti-Money Laundering (AML) and Know Your Customer (KYC) to safeguard the customers and keeping the integrity of the market. Japan has ensured that there are comprehensive regulations with the goal of promoting the technology in cryptocurrencies as well as managing the risks including money laundering and terrorism financing. Thus, due to the clear-defined rules, Japan became an example of the effective cryptocurrency regulator and also provided certainty in the given market for its participants to a reasonable extent.

The South Korean authorities have also established constraints for the operations of cryptocurrency exchanges due to the need to curb any misuse such as money laundering as well as enhance the

---

<sup>437</sup> Filip Windak and Rafal Wloczka, *Markets in Crypto-assets (MiCA) – New EU law on crypto-assets*, BIRD & BIRD (Jan. 25, 2024), <https://www.twobirds.com/en/insights/2024/global/markets-in-crypto-assets-new-eu-law-on-crypto-assets>.

protection of investors.<sup>438</sup> The bitcoin exchange markets in South Korea are duly required to implement the AML and KYC standards, thus making the whole process completely transparent and accountable. They include these policies as a way of ensuring that the market becomes cleaner for investors and the confidence in the cryptocurrency market increases. South Korea's move to regulate cryptocurrency may have raised some questions at the initial stage of the regulation, though the country is consistent with the creation of a vibrant market space for cryptocurrency in the region.

On the other hand, the Chinese government has taken quite a strict stance with respect to cryptocurrencies and has opted for a complete ban on cryptocurrency exchanges and ICOs to address issues of instability and fraud.<sup>439</sup> Due to its concerns of financial stability, the Chinese government has been many a times critical of the speculative aspect of cryptocurrencies. Nevertheless, at the same time, China is actively working on the creation of its Digital Yuan as it is interested in the settlement of digital financial transactions under its supervision and as a tool for financial modernization under the State's auspices. This situation can also be viewed in the context of the application of regulatory restrictions and government led activities to coordinate the use of the potential of blockchain technology and inhibit excessive risks.

The Asian continent presents a mosaic of regulatory stances towards cryptocurrencies. From nurturing innovation and protecting consumers to implementing stringent controls for risk management, the approaches vary widely. As the digital currency ecosystem grows more complex, the Asian authorities are poised to refine their

---

<sup>438</sup> BSC News, *South Korea Plans Regulatory Crackdown on Crypto Mixers Amidst Rising Money Laundering Concerns*, BSCN (Jan. 15, 2024), <https://bsc.news/post/south-korea-plans-regulatory-crackdown-on-crypto-mixers-amidst-rising-money-laundering-concerns>.

<sup>439</sup> Vidya Ranganathan and Summer Zhen, *Bruised by stock market, Chinese rush into banned bitcoin*, REUTERS (Jan. 25, 2024), <https://www.reuters.com/technology/bruised-by-stock-market-chinese-rush-into-banned-bitcoin-2024-01-25/#:~:text=Crypto%20trading%20and%20mining%20has,like%20gold%2C%22%20says%20Run>.

regulatory frameworks in order to meet the emerging challenges and harness new opportunities.

### **Law Enforcement Operations**

U.S. and European authorities are orchestrating joint operations to clamp down on the unlawful cryptocurrency use by harnessing the shared expertise and modern policing methods. In the United States, some operations like Operation Cyber Sweep involved the FBI, DEA, and ICE in addressing a wide range of online criminal activities with a focus on those involving with cryptocurrencies. These agencies function cohesively with a common goal of tracking down individuals or groups that engage in criminal activities online and using their unique knowledge and equipment to neutralize the criminals and bring them to justice. The same goes for Operation DisrupTor which was led by the Department of Justice (DOJ) which is only focused on darknet marketplaces, leading to the arrests of vendors and the freezing of millions of dollars in cryptocurrencies. These operations focus on high-profile targets in the dark web environment that attempts to curtail the use of cryptocurrencies in the sale of banned substances, arms and other alike products.

In Europe, there are also joint police operations to combat crimes involving cryptocurrencies. Europol is a key actor capable of coordinating the efforts of the EU member states as well as ensuring that they share valuable information and work together on cases related to emerging threats in the sphere of cybersecurity. Some of them includes the shutdown of dark web markets like Alpha bay and Hansa market where the law enforcement agencies of several countries worked hand in hand to arrest the persons of interest and confiscate their respective properties. Also, the Joint Cybercrime Action Taskforce (J-CAT) is a special squad of law enforcement agencies from different countries to combat the cybercrime including those related to cryptocurrencies.<sup>440</sup> In the case of J-CAT, cooperation and sharing of information between member countries increases the capacity to track and dismantle the global cybercriminals.

---

<sup>440</sup> *Joint Cybercrime Action Taskforce (J-CAT)*, EUROPOL, <https://www.europol.europa.eu/operations-services-and-innovation/services-support/joint-cybercrime-action-taskforce> (last visited July 08, 2024).

These law enforcement operations illustrate the common intention to combat the issues created by cryptocurrencies and other related crimes through collaboration among agencies. Specialized knowledge, new methods and cooperation with the counterparts around the world, allows the law enforcement to combat transnational crime, remove criminal structures and protect the financial sector. As cryptocurrencies remain more popular, hence the police forces do not relax and will need to focus on preventing the use of new threats and the use of digital money for criminal purposes.

### International Cooperations

Worldwide partnerships are vital in confronting the crypto challenges and battling the related offenses across borders. Major international bodies and projects foster nation-to-nation cooperation to set universal benchmarks in order to strengthen the policing abilities and craft cohesive regulatory approaches. Some of the examples of the International Cooperation in this particular regard are as follows:

- **The Financial Action Task Force** that is popularly known as FATF is an inter-governmental body that determines standards for Anti Money laundering and Counter-terrorism financing.<sup>441</sup> In February 2019, FATF issued guidance on virtual assets, classifying VASPs (Virtual Assets Service Providers) as O Fuels and demanding from the member countries to include VASPs and enforce proper AML/ CTF standards. As a result, FATF wants the cryptocurrency markets to be more transparent and accountable and eliminate the chance of financial criminals and terrorists that are utilizing cryptocurrencies for their financial operations.
- **The International Criminal Police Organization (INTERPOL)** is an important organization that provides the necessary support to police departments of different countries by cooperating to prevent and solve international

---

<sup>441</sup> *What is FATF*, BUSINESS STANDARD, <https://www.business-standard.com/about/what-is-fatf> (last visited July 08, 2024).

crimes including those connected with the use of cryptocurrencies.<sup>442</sup> INTERPOL offers capacity building and support to the member countries in form of training, operational and technical support to improve on the ability of law enforcement agencies to deal with offences involving use of cryptocurrencies. Through promoting cooperation and sharing of intelligence, INTERPOL enhances the global co-sphere against the new threats identified in the age of digitalization which makes the swift initiative of law enforcement to trace the usage of cryptocurrencies possible.

- **The Group of Twenty (G20)** consisting of the largest economies of the world acknowledges the need for the synergistic approach to the regulation of cryptocurrencies and prevention of the crimes connected with their usage.<sup>443</sup> FATF recommendations are proposed to be implemented in the member countries of G20 and cooperation in enhancing the compliance of the global regulation in the sphere of the digital assets is recommended. As a result, the G20 has recently focused on the fields of dialogue and cooperation between policymakers, regulators and law enforcement authorities in order to ensure financial stability, integrity and security in the framework of digital economy.

In conclusion, institutions including FATF, INTERPOL and G20 have a crucial role in fighting the actual and multifaceted character of cryptocurrency-linked criminal work. Thus, creating consolidated reporting, coordinating actions, increasing capacities and setting standards may possibly improve the capacities of countries to fight the financial crimes, maintain the financial system's integrity and protect the people from using cryptocurrencies for criminal activities.

---

<sup>442</sup> *What is INTERPOL?*, INTERPOL <https://www.interpol.int/en/Who-we-are/What-is-INTERPOL> (last visited July 08, 2024).

<sup>443</sup> James McBride and Noah Berman, *What Does the G20 Do?*, COUNCIL ON FOREIGN RELATIONS (Oct. 11, 2023, 10:15 AM), <https://www.cfr.org/backgrounder/what-does-g20-do>.

## 7.3.2 India's Strategy for Tackling Crypto Crimes: Lessons from Abroad

### Law Enforcement and Monitoring

#### 1. Enforcement Directorate (ED):

Generally, the laws prohibiting money laundering and violation of the foreign exchange laws are implemented by the ED. It has been involved in the pursuit of cases with an association of cryptocurrency fraud and illicit business. The ED has carried out many operations such as the operation where Cryptocurrencies are used in Money Laundering and Ponzi Schemes.<sup>444</sup>

#### 2. Financial Intelligence Unit, India (FIU-IND):

FIU-IND is an organization that compiles and distributes financial data to prevent money laundering and terrorist financing. It tracks the STRs with respect to cryptocurrencies. FIU IND shares information and coordinates with other national and international organizations in combating of the unlawful use in cryptocurrencies.<sup>445</sup>

#### 3. Cyber Crime Units:

The different police and computer emergency response teams at a state level and the Cyber Crime Division of the Central Bureau of Investigation (CBI) investigate cryptography related cybercrimes, including hacking and ransomware attacks on those dealing with cryptocurrencies. Training and Capacity building units undergo training to increase their capacities and expertise in addressing cyber-crimes as well as the efficient use of advanced technology in carrying out the investigations with respect to the crypto space.

In this context, India is on the crossroads of its approach towards policy formation and handling of activities associated with cryptocurrencies and crimes. Admittedly, much progress has been

---

<sup>444</sup> Press Trust of India, *ED seizes funds worth Rs 90 crore kept in Binance, ZebPay, WazirX wallets*, BUSINESS STANDARD (Apr. 30, 2024), <https://mybs.in/2dVD98i>.

<sup>445</sup> Rajesh Kumar, *Financial Intelligence Unit Penalizes Binance \$2.25 Million For Anti-Money Laundering Violations*, LIVELAW (June 24, 2024, 07:45 PM), <https://www.livelaw.in/news-updates/financial-intelligence-unit-penalizes-binance-225-million-anti-money-laundering-violations-261304>.

made in the United States and other countries in law enforcement and regulation and oversight processes, however lessons can be learned from other countries' experiences. India holds the potential to develop a proper structure of the regulation that will take into account the interests of both security and consumers as well as encourage innovations in the sphere of cryptocurrencies based on the best foreign experience of the countries such as but not limited to the USA, EU countries, Japan, South Korea, etc.

Moreover, India can take several key steps to address the challenges and opportunities presented by cryptocurrencies by ensuring effective regulation, enhanced cooperation and proactive measures for consumer protection. Some of the key steps that India might consider in this regard are as follows:

- 1. Developing a Clear and Robust Regulatory Framework:** India needs to concentrate more on the legal framework on cryptocurrencies including AML-KYC compliances to be made mandatory. Formation of concrete rules along with regulation will essentially ensure the standardization of functioning within the cryptocurrency market and decrease possibilities for various unlawful activities affecting investors in the crypto space.
- 2. Enhancing Inter-Agency and International Cooperation:** As most of the crimes related to cryptocurrencies have an interconnection between different countries, hence India should increase the coordination of the police force and regulators within India and across the globe. Enhancing cooperation and intelligence exchange will enhance efficiency of identification, examination and prosecution of crypto crimes across the borders as well as it will improve the alliance against new threats arising with the development of more complex products and services in the crypto environment.
- 3. Adopting a Proactive Stance in Regulation and Consumer Protection:** Regarding regulation and consumer protection, India can be more active and prescribe the use of reliable security measures for the exchange and platforms that

operates with cryptocurrencies. In the same way, looking at the possibility of insurance for the exchanges can also add a certain level of security in the form of insurance as if there will be a breach of security or a malfunctioning of the exchange then at least the protection to the investors could be ensured. Thus, it would be beneficial for the Indian government to implement as many consumers protection measures as possible in hope to encourage more people to invest in cryptocurrencies with confidence and positive mindset.

4. **Investing in Advanced Technological Tools:** There is a need for India to implement sound technological equipment for the tracking of Cryptocurrencies dealings. Through the use of Blockchain analytics, Artificial Intelligence (AI) and Machine learning, the authorities will be able to track illicit funds, real-time detection of suspicious activities and patterns of the offender's behaviour. With the help of the progressive technological approaches, it will be possible to enhance the enforcement capacities in India that will enhance the country's ability to respond to new threats in the sphere of cryptocurrencies.

Hence, through proper execution of the following recommendations as mentioned above, the valiancy of cryptography in India is possible while at the same time avoiding the cryptocurrency risk factors. A strong legal framework embracing the technologies, better cooperation, protection of consumers' rights and developments in sophisticated technologies will help India to address those challenges which are becoming critical while supporting the innovations, credibility and security of the future of cryptocurrencies in India.

## 7.4 Navigating the Complex Legal Landscape of Crypto Crimes

### The Problems and Their Addresses

Criminal activities relating to crypto currencies are considered to be a complex phenomena that go beyond the simple use of digital

means of payment. One of the biggest features is that they are necessarily of an international nature. Cryptography criminals may act across borders. This lets them to conduct their unlawful activities from one country while they target their victims or individuals in another country. This global span presents challenges for the police in a way that it makes it much more difficult to work on these cases as it demands global cooperation. The very nature of these forms of cryptocurrencies and blockchain make it even harder for law enforcement agencies to combat the associated crypto crimes. Because of the anonymity of the transactions, high levels of security through encryption and decentralized structure, it is highly challenging to track the prohibited activities or their perpetrators. Therefore, policing appears to have become highly complex and requires special skills and the best technological apparatus to enable law enforcement agencies to handle the challenges of investigations efficiently in the crypto space.

Further, the threats associated with cryptocurrencies are vast and dynamic, given the constant changes to criminals' modus operandi due to the constant targets to spot new weak links in applying the blockchain. The new forms of threats like DeFi scams, rug pulls and NFT frauds pose further difficulties to the regulators and the enforcement agencies. To track these emerging threats there is a need to be very keen and also ensure that there are keen adjustments in the regulations. Here again, regulatory arbitrage represents another big threat since the mal-adjusted legal frameworks in different jurisdictions can be manipulated by the offenders. These disparities allow the criminals to exploit the lack of effective regulation or the comparatively loose regulation in some countries to carry out their unlawful practices. To tackle this problem, it is essential to synchronize the degree of legal requirements and improve the international relations establishing cooperation in order to eradicate these flaws and to act as one in fighting against cryptocurrencies-related offenses.

It is common to observe that numerous illicit activities involving cryptocurrencies utilize techniques of social engineering as well as psychological influence to gain the trust of the potential investors. Criminals use intricate methods like phishing, impersonation and

appealing to people's emotions to deceive and get money from unknowing victims. It is necessary to increase the level of concern and awareness among different population groups and encourage them to follow the cybersecurity best practices which would limit the impact of these types of scams. Due to these complex issues, governments and regulatory authorities across the world are trying to address the issues in creating sound policies and the right regulatory mechanisms. The regulation of the crypto market must satisfy the consumers' protection eagerness, financial stability and effectively allow the innovative development of the concerned sector, hence it is essential for considering numerous interests and positions of various stakeholders. It is for this reason that it is so important to strike the right balance when creating the regulations, so that the new financial model in the form of cryptocurrencies could be developed by meeting the society's needs and at the same time preventing unlawful actions.

## 7.5 Technological Solutions: Fighting Crime in the Digital World

Technology is central and pivotal in tackling the problem of cryptocurrency crimes, since it presents various solutions to mitigation and handling of such activities. Some of the technological solutions in this aspect are as follows:

- **Blockchain Analytics:** Generally, it is believed that Governments and police forces use the software to analyze cryptocurrency transactions in order to find the illicit ones.<sup>446</sup> Today, there are services offered by firms like Chainalysis, Elliptic, and CipherTrace that help the authorities to understand the blockchain data, identify trends that are suspicious and link such transactions to real-life profiles. Blockchain analytics tools which use complex algorithms and machine learning algorithms give insights and expose criminal activities like money laundering, terrorist financing

---

<sup>446</sup> *Blockchain-What it is and why it matters*, SAS INSTITUTE, [https://www.sas.com/en\\_in/insights/analytics/blockchain.html](https://www.sas.com/en_in/insights/analytics/blockchain.html) (last visited July 08, 2024).

and online frauds and provide enforcement agencies with the specific data about the culprits and criminal groups.

- **Artificial Intelligence (AI) and Machine Learning:** Machine learning and AI technologies are used to study enormous amounts of information and detect patterns of criminal activity and possible threats in the context of cryptocurrencies. The police services use AI algorithms to analyse vast amounts of data, find potentially malicious transactions and draw attention. Analyzing previous occurrences, the machine learning models can improve the efficiency of eyewitness investigations and offer timely interference with unlawful activities. By using artificial intelligence and machine learning to fight cybercriminals, the communities will be protected from these types of criminal activities linked to cryptocurrency.
- **Cybersecurity Measures:** The governments and regulatory authorities spend heavily in deploying strong security measures for counter hacking and other cyber risks aimed at the cryptocurrency trading platforms and digital wallets. This includes the advancement of encryption techniques, the incorporation of intrusion detection and management of cyber attack incidents with the goal of addressing them in real time. With the focus to strengthen the cybersecurity, the authorities strive to maintain the stability of a financial system by safeguarding the digital assets from illicit access and preserve the confidentiality of the cryptocurrency markets. Furthermore, public awareness is created and training programs are conducted to ensure that the people who use cryptocurrency understands the measures that are meant to be possibly taken against the cyber criminals.

Advanced technologies like blockchain analysis, artificial intelligence, machine learning and cybersecurity tools are crucial in combating cryptocurrency-related illegal activities. By employing these cutting-edge methods, authorities can improve their ability to identify, probe and counter act unlawful actions in the digital currency realm. Such an approach helps in building confidence,

maintain honesty and ensure safety within the cryptocurrency environment.

## Case Studies

### 1. Operation DisrupTor (United States)

Operation DisrupTor was initiated by the DOJ, FBI, DEA and ICE in mid-2020 to target DNMs as well as the people who used them for the commission of crimes.<sup>447</sup> The operation led to the arrest of 179 people around the world and the freezing of a huge monetary amount. About 5 million dollars and different cryptocurrencies, 500 kgs of drugs and 64 weapons were seized. This operation demonstrated that how cooperation with the international partners as well as the use of sophisticated analytical methods might essentially help in the prevention of the activities of darknet markets and crimes involving cryptocurrencies.

### 2. Take down of Darknet Markets – Europol (Europe)

Europol's activity includes coordination of several beneficial actions against the darknet markets.<sup>448</sup> Probably the most significant of them was the closedown of AlphaBay and Hansa Market in 2017. Such operations entailed cooperation with law enforcement departments of different countries. The takedowns affected large segments of the darknet economy and shown that the organizers of the sites can be detained with the help of concerted action of the police forces of different countries.

### 3. Chinese authorities halting the operations of Bitcoin exchanges

Cryptocurrencies are popular in China and as a result in 2017, their government has prohibited the operations of exchanges and ICOs to avoid financial risks for the country and unlawful activities

---

<sup>447</sup> BARRETT, *supra* note 77.

<sup>448</sup> Costantino Grasso, *Europol: its origins, functions, and future development*, UK IN A CHANGING EUROPE (Dec. 06, 2016), <https://ukandeu.ac.uk/explainers/europol-its-origins-functions-and-future-development/>.

in this sphere.<sup>449</sup> This caused several large exchanges to be shut down and as a consequence there was a general decrease of cryptocurrency trade activity in the country. Pertaining to this, the Chinese authorities are regarded as actively keeping an eye on the illegitimate crypto trading and are relentless in trying to curb illicit crypto-related operations, especially when it concerns money laundering and terrorism financing.

As for the threats of cryptocurrencies and their usage in criminal activities, the governments and other regulating authorities all around the world already work on their responsible utilization and fight against cryptocurrency-associated crimes by the help of regulation and law enforcement measures, cooperation on the international level and developments in the field of technological innovations. This is admittedly still a work in progress where the concerned progress is conceptualized as incremental due to the ever-shifting nature of cryptocurrencies and related technologies and thus constantly adapting new and creative approaches to regulation and enforcement. Nevertheless, it is evident that cryptocurrency and related crimes pose threats to the global economy, nonetheless, through strict AML and KYC policies, improved cooperation between authorities globally, use of innovative technologies and active approach, these malpractices can be fought off efficiently. Governments, police forces and all crypto-related communities worldwide have to continue to work together in an attempt to implement that balance where on one hand we want to give our support to new and eager crypto projects, while on the other hand, the community and other major stakeholders of the entire crypto ecosystem also needs to prevent the usage of cryptocurrencies to be used for criminal activities by the criminals.

## 7.6 Preventing Crypto Crimes: Key Methods of Protection

Safety from crypto crimes is something that one has to defend. The people should be willing to learn and be cautious. In turn, combating crypto crimes requires the efforts of law enforcement

---

<sup>449</sup> Francis Shin, *What's behind China's cryptocurrency ban?*, WORLD ECONOMIC FORUM (Jan. 31, 2022), <https://www.weforum.org/agenda/2022/01/what-s-behind-china-s-cryptocurrency-ban/>.

agencies, the development of the necessary legal acts and of-course education as well as awareness-raising activities. As a matter of fact, the awareness of frequent crypto scams, frauds, and security recommendations is vitally important. This ranges from the perceived understanding of investing and transacting with cryptocurrencies, its dangers, its weaknesses for instance, phishing, scams, fake ICOs and others. It is recommended to read reliable sources and stay up to date with what is happening in the world of cryptocurrencies in order to minimize the risks. Extensive investigation and research on any digital currency one intends to invest in or any project allied to cryptocurrencies is always another important step. Assess the legal requirements of the project, credibility of everyone involved as well as credibility of technology all holds for the vital importance. Do not expect on the products that promise fixed rates of return or seemingly fantastic investments as they are most likely scams or get-rich-quick schemes rather it is arguably preferred to invest an amount that you are willing to lose as far as the world of cryptocurrencies are concerned. Such a level of attention can assist one in avoiding fraudulent schemes and using unreliable business opportunities to a greater extent.

Basically, the wallet security is instrumental in the protection of your digital assets. It is therefore called for to use credible and reliable cryptocurrency wallets. Some of the measures of securing the coins includes having 2FA, using passwords and when storing them using hard wallet or cold storage. Keeping your wallet up to date and not sending your details such as personal information or personal key to any person in the globe usually goes a long way in avoiding hackers and various other fraudsters. Being very careful when interacting with links and attachments from people you do not know, emails, messages, or posts on social media is quite crucial to prevent any phishing and fake social engineering schemes. The common tactic employed by scammers is impersonation of organizations and individuals and hence one should be on the lookout with respect to such scams. One should also exercise caution when dealing with SCMs and never provide any identity or financial details on unverified communication channels or ill-reputed websites.

In terms of trading cryptocurrencies in exchanges, the safe and

secure exchanges with solid security features and that are registered in accordance with the laws of the country they operate in should be preferably used. One must undertake the right research on the exchange to confirm its credibility and to establish whether it falls under the stipulated regulatory authorities. For instance, one must ensure that he or she is dealing with a regulated exchange or an exchange based in the country of his or her residence because some exchanges may be full of fraudsters or are vulnerable to hackers. Employing secure exchange helps in the standardise ways through which your transactions as well as assets can be secured. It is also necessary to be up to date with the emerging security risks and issues in the matter of cryptocurrencies. One must keep a close eye on the newspapers, groups, forums or security alerts and advisories to check or predict the emerging threats that may affect an organization or an individual investor. One must also act fast to deploy security, fixes and updates for the wallets as well as the devices that he or she use to deal with the cryptocurrencies.

Thus, the prevention of these crimes calls for an active engagement on the part of the owners of cryptocurrencies as well as continuous education on the matter is also essentially required as this space is very new. Education and Awareness are the strategies that are fundamental for the development of this space. Hence, one should not neglect to be aware of some typical cases of using crypto scams, frauds and security measures. This ranges to learning of the different dangers and frauds in the cryptocurrency markets and ICOs including phishing, contrivance coins and fake ICOs. To make efficient decisions and be able to avoid threats and related events, it is important to monitor all the trends and developments in this novel space. Education helps people to notice such signals and act in a way that would help safeguard their hard earned capital. Besides, continuously updating oneself, it is crucial to carry out a random or general research on the chosen cryptocurrency or any project that one wants to invest in or contribute to. This implies assessing the credentials of the exact project, reviewing the performance of the partners involved and comprehending the base technology. One must not fall prey to products such as get-and rich-quick schemes and anything that has a promise of high returns with little risks involved as these are high risk investments and they usually put the lid on the

amount you are willing to lose if the venture goes south. It is a very cautious way of investigating that allows people to avoid scams and untrustworthy companies and protect their money from being used in reckless investments.

Another important step that can be taken to safeguard digital assets is to safe the generated wallets and their respective private keys. The first that is obvious is the requirement to work with reliable and safe cryptocurrency wallets. It is possible to cut the threat of unauthorized access and theft through tight security measures starting with the use of 2FA, the choice of hard-to-guess passwords and cold storage in hardware wallets. Other important measures are updating the wallet software of choice frequently and never disclosing to anyone data such as the private key. Furthermore, the sender's name should be scrutinized, so as to not to fall as victims with respect to phishing via easily clickable links, emails and shareable attachments in messages or social media apps. It is recommended to be very cautious when disclosing personal or financial details and always check if the contact details received and the sites that one is visiting are genuine or not. Before engaging in trading involving cryptocurrencies on exchanges, it is fundamental to deal with reputable exchange platforms that have strict security measures coupled with full compliance with the regulations. One should carry out research on the authenticity and the legal status of the exchanges prior to using them. Some investments represent relatively higher risk either due to lack of regulation or the exchange being located overseas which increases vulnerability to scams or cyber-attacks.

Thus, it can be stated that to protect oneself from 'crypto crimes' one must be active and informed as 'crime knows no boundaries', especially in the virtual world. Prevention has always been the key, starting with the education and creating awareness of such heinous crimes. That is why people should be knowledgeable of everyday crypto scams, frauds and security tips and tricks. This also entails being aware of the precautions and adversities that are connected with dealing in and with digital currencies and ICOs like phishing assaults, Ponzi plots and false ICOs. Knowledge is compiled via the updating procedure and updating oneself with current trends. The final factor includes the common tips about the proper research and due diligence

for any crypto investment or for joining any crypto related project. This involves questioning the authenticity of a project as well as assessing the credibility of the team members and the technology on which the project is based. Do not fall for claims that you get back your money many times over or get into an investment deal that you cannot afford to lose. Thus, the detailed examination saves people from the desire to become involved in a fake program and an unreliable business which means that they will not be reasonably deceived.

Wallet security is a basic branch of preserving digital goods and self-evident reality. Thus, it is necessary to use reliable and safe wallets for cryptographically sound assets. One should avoid common security loopholes like weak passwords, use of one-factor authentication and hot wallets for storing the coins, rather one may use two-factor authentication, complex passwords and cold storage. The other preventive measures include frequently updating the wallet software and never letting anyone see your sensitive information and private keys. Moreover, one trendy and lucrative offer or another, should be evaluated thoroughly, especially if it was received via e-mail, message or post, in order to avoid phishing and alike scams or attacks. In order to avoid such tricks, one should check the legitimacy of the communication channels and websites to avoid sharing any personal and financial data. When trading, the exchanges used should be credible platforms that have great security measures and that operate within the stipulated legal frameworks. Double check that the exchange is legit and regulated by the necessary authorities to ensure that it is safe to trade on it. Avoid using centrally controlled or offshore exchanges that could turn out to be very risky as they could easily be the subject of fraud or hacking. Secure exchanges also enable users to conduct transactions with respect to cryptocurrencies safely and these guidelines represent that the probability of loss through exchange's weaknesses or fraudsters is greatly minimized.

Another good measure that one may take is not to invest everything that he or she have into one coin or token only. One must diversify his or her portfolio into various kinds of assets to reduce the risks of having most of the money disappear with a single event or a given coin. It can also prove useful to consult experts on the

matter. It is wise to seek help from financial specialists or cryptocurrency experts before loading up your wallet. Consult only established experts who shall give out advice without the influence of a certain kind of business or another, depending on an individual's objectives and tolerance to risk. Last but not the least, if one experiences either phished or scammed incident while dealing with the cryptocurrencies then he or she do contact the legal bodies that include law enforcement, financial regulatory bodies or consumer affairs agencies. Always report scams and frauds as this can help protect other people and support the fight against crypto crime. Through these reasonable preventive measures and by being remaining actively cautious, the users can reduce the chances of being a victim to such crypto crimes and ensure that their virtual money and wealth is safe. For this reason, preventive measures are critical in the constantly changing world of cryptocurrencies.







## Chapter 8

# Key Insights into the Crypto Ecosystem: Trends, Opportunities, and Risks

*"The ability to create something which is not duplicable in the digital world has enormous value ... Lots of people will build businesses on top of that."*

— **Eric Schmidt**<sup>450</sup>

### Synopsis

- 8.1 The Investors Shaping the Crypto Ecosystem
- 8.2 Crypto: Bubble or Breakthrough?
- 8.3 Not All Cryptocurrencies Are Gems, Nor Are They All Scams!
- 8.4 Bitcoin: The Gateway to Understanding the Entire Crypto Space
- 8.5 Ethereum: The Driving Force Behind Web3 and Decentralization
- 8.6 Meme Coins : A Cultural Phenomenon or Fad?
- 8.7 NFTs: A Disruptive Innovation or a Passing Bubble?
- 8.8 Staking in Crypto: A Passive Income Opportunity
- 8.9 Crypto Burning: Reducing Supply, Boosting Value
- 8.10 ICO (Initial Coin Offering): Fueling Innovation in the Crypto World
- 8.11 Decoding Trading Charts: A Must-Know for Crypto Traders

---

<sup>450</sup> Eric Schmidt, The ability to create something which is not duplicable in the digital world has enormous value ... Lots of people will build businesses on top of that., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

## 8.1 The Investors Shaping the Crypto Ecosystem

Types of investors in the crypto ecosystem can be broadly classified into two broad categories and they are day traders and holders (hodlers). The comprehensive description of the day traders and the long term holders are as follows:

### 8.1.1 Day traders:

The day traders buy and sell cryptos generally within a short time of less than one hour.<sup>451</sup> They make use of these brief price changes in order to obtain fast profits for themselves. Day traders majorly depends upon technical indicators to recognize the regularities in the market and they utilize that in making the rational trading decisions. Furthermore, they keep a very close tabs on the news and other factors that could have an impact on cryptocurrencies' prices.<sup>452</sup>

#### Advantages:

- **Potential for quick profits:** In case of successful ventures, day traders can earn substantial amounts within a short period.
- **Flexibility:** When it comes to day trading, it is possible for participants to enter or exit at any time without being restricted and this enables them to have more command over their finances.
- **Constant learning:** Day trading involves constant learning as well as updated knowledge of current information regarding the cryptocurrency industry. This can be exciting for those who enjoy learning about new technologies and innovations on regular basis.

---

<sup>451</sup> Mediawire, *What is Crypto Day Trading? Beginners Guide*, THE ECONOMIC TIMES, <https://economictimes.indiatimes.com/industry/banking/finance/what-is-crypto-day-trading-beginners-guide/articleshow/90377862.cms?from=mdr> (last updated Mar. 22, 2022, 5:45 PM).

<sup>452</sup> *Day Trading For A Living – Pros And Cons Of Trading For A Living*, KOTAK SECURITIES, <https://www.kotaksecurities.com/ksweb/Research/Investment-knowledge-Bank/day-trading-for-a-living> (last visited Mar. 28, 2023).

**Disadvantages:**

- **High risk:** The market is very risky because day trading is highly unpredictable with its volatility levels. A single mistake may lead to huge losses.
- **Time-consuming:** Day trading can be time consuming and stressful because it involves constantly monitoring the market and making quick decisions.
- **High fees:** This business of exchanging cryptocurrencies on centralised exchanges is usually associated with high fees, which will negatively affect profits to a certain extent.

**8.1.2 Holders (Hodlers):**

These are those individuals who purchase cryptocurrencies intending to hold them for a long duration.<sup>453</sup> They have faith that the worth of the respective cryptocurrencies will increase in the future, hence they aim at reaping their benefits much later.<sup>454</sup> Hodlers may be grouped into long-term, mid-term and short term hodlers based on how long they may retain their holdings.

**Advantages:**

- **Potential for long-term profits:** When the value of the cryptocurrencies goes up, hodlers can make huge gains over time.
- **Less risk:** A general opinion is that long lasting investment is less hazardous as opposed to day trading, since it does not depend on temporary alterations in prices.
- **No time commitment:** To be a holder one do not need to dedicate the significant amounts of time on watching the markets or making trades.

---

<sup>453</sup> Jake Frankenfield, *HODL: The Cryptocurrency Strategy of "Hold on for Dear Life" Explained*, INVESTOPEDIA, <https://www.investopedia.com/terms/h/hodl.asp> (last updated July 18, 2022).

<sup>454</sup> Matt Hougan, *For Bitcoin, HODLing Is The Best Strategy... With One Big Caveat*, FORBES (Apr. 23, 2018), <https://www.forbes.com/sites/matthougan/2018/04/23/bitcoin-hodling-is-the-best-strategy-with-one-big-caveat/?sh=49d032933266>.

**Disadvantages:**

- **Lower liquidity:** One challenge hodlers face is low liquidity, especially if they need to sell their position fast.
- **Opportunity cost:** By holding onto digital assets for an extended period, one misses out on potential earnings that would have been made from other investments.
- **Emotional attachment:** When hodlers become emotionally tied to their investments, then their judgement could be clouded and the result with respect to them might end up in making wrong decisions.

In general, both day trading and hodling may turned out to be profitable investment strategies in the crypto ecosystem. However, they also have their own sets of pros and cons. Ultimately, it is a matter of personal risk tolerance, investment goals and preferences. It is hard to tell that which kind of investor is more profitable. Each investor's strategy and objectives are unique, therefore, success differs from one market situation to another. The day traders mainly focuses on quick gains by buying or selling the assets for short durations usually within a day. They use technical analysis and trends in the market to make the trade decision as well as the leverage that can increase the amount of the expected returns. Although day trading can be lucrative, it is very risky such that majority of day traders suffer losses.

On the other hand, hodlers concentrate on long-term holding believing that their value will appreciate over time. Depending on how long the cryptocurrencies are held, this group can further be classified into long-term investors (such as retirement accounts), mid-term investors (who hold for generally about three years) and short-term investors (who hold for generally less than a year).<sup>455</sup> Long-term hodlers are those who hold their assets for several years, believing that this will lead to a great increase in their value over time. Their major concern is not short term price changes and they are ready to withstand market collapses just to hope for the long-run

---

<sup>455</sup> Rafael Schultze-Kraft, *Quantifying Short-Term and Long-Term Holder Bitcoin Supply*; GLASSNODE INSIGHTS (Nov. 17, 2020), <https://insights.glassnode.com/quantifying-bitcoin-hodler-supply/>.

benefits. Mid-term hodlers normally keep their assets for a few months up to a year with an expectation of substantial price rises within that period. They may also employ technical analysis and market trends as that guides them during deciding on the best timing to trade either by buying or selling the assets involved. Short-term hodlers tend to keep their assets only for shorter periods of time like from few weeks to a few months. They can be more focused on short term price actions and may use tools such as technical analysis among others to time markets accordingly. Ultimately, each type of investor's profitability depends on multiple factors including the characteristics of traded assets, market situations and the trader's experience. Goals and risk appetite should be taken into account before adopting any approach by investors.

## 8.2 Crypto: Bubble or Breakthrough?

Since 2009, when Bitcoin was introduced into the market, discussions has been revolving around the question that whether cryptocurrency is a bubble or an opportunity.<sup>456</sup> Some believe that the current cryptocurrencies prices are too high to be sustained and hence that there is a bubble in the market that will eventually bust, sooner or later. Meanwhile, others are convinced that crypto currency marks a radical break from conventional concepts of money and it can change our world for better. Volatility in the market which can see-saw even within one day gives rise to those who see it as a bubble.<sup>457</sup> Moreover, absence of regulatory oversight and prevalence of scams and fraudulent schemes have raised questions about how dependable the market might be in future. Several occasions have led to crashing down of coin prices resulting to significant losses for many investors till now.

---

<sup>456</sup> Emily Flitter, *It's Hard to Tell When the Crypto Bubble Will Burst, or If There Is One*, THE NEW YORK TIMES (Jan. 27, 2022)

<https://www.nytimes.com/2022/01/27/business/crypto-price-bubble.html>.

<sup>457</sup> Edward Harrison, *The Easy Money Era is Over and the Crypto Bubble With It*, BLOOMBERG (Nov. 16, 2022, 1:43 AM),

<https://www.bloomberg.com/news/newsletters/2022-11-15/the-easy-money-era-is-over-and-the-crypto-bubble-with-it>.

On the other hand, proponents of cryptocurrency argue that its underlying technology has the potential to change finance as we know it currently. They cite blockchain's decentralized nature which obviates the need for intermediaries like banks, and the use of cryptocurrencies as payment modes in commercial transactions. Furthermore, some people feel that Bitcoin's finite supply makes it valuable unlike fiat currencies that can be printed endlessly. However, whether one sees it as an opportunity or a bubble is dependent upon one's own investment goals.

For investors having a focus on short-term gains through quick returns on profit-making strategies, cryptocurrency might be seen as a speculative bubble. Conversely, if you are someone who cares about the future possibilities of these technologies then you might find yourself considering cryptocurrency to be a disruptive market with groundbreaking opportunities for those willing to invest in it. Furthermore, Investing in cryptocurrency is risky just like other alike markets such as stocks, equity, mutual funds, ETF, etc. Therefore, it is important to research and understand the potential risks involved thereunder. It is also necessary to have a long-term investment plan and be ready for market volatility. Although there are no guarantees with any form of cryptocurrency investment, those who properly grasp the technology and the market could use this uniqueness as an opportunity.

### **8.3 Not All Cryptocurrencies Are Gems, Nor Are They All Scams!**

Cryptocurrencies have become very popular over the years with the new ones frequently introduced into the market time to time. Some cryptocurrencies have been successful investments, while others did not meet their expectations. Hence, it must be understood that all cryptocurrencies are not gems and on the other hand, all cryptocurrencies are not frauds. For example Bitcoin, Ethereum, Binance Coin, Cardano and Solana were some of the successful cryptocurrencies that have demonstrated their ability to yield good returns over time and they have gained widespread acceptance by the investors. An instance here is bitcoin which has been one of the best performing assets within the past decade recording over 800,000%

since its inception.<sup>458</sup> However, some cryptos have proven to be scams. Bitconnect is one of the most notable cases of a scam virtual currency. Bitconnect was a platform that facilitated lending and trading, with promises for massive returns to its investors, but turned out to be operated as a Ponzi scheme.<sup>459</sup> After its fraudulent actions were halted by the regulator in 2018, the value of this cryptocurrency collapsed.

It is worth mentioning that not all failed cryptocurrencies are frauds. Some cryptocurrencies failed because they were not adopted or there was insufficient market demand for them. Take for instance, Dogecoin, which was created as a parody without any real value proposition. Despite this, it gained significant popularity in 2021, partly due to endorsement from celebrities such as Elon Musk. In summing up not all cryptocurrencies are gems but equally not all cryptocurrencies are fraudulent. As such, investors should always conduct an extensive research on any cryptocurrency before investing in it, considering the risks involved therein. There has been success with some cryptos while others have been found as frauds or have flopped below expectations.

Scams represent one of the greatest risks in the crypto market today. In several instances, projects disappeared and left investors empty-handed or with losses arising from frauds perpetuated against them. Some of the famous examples in this regard, are as follows:

**Squid Game Token:** In late 2021, the cryptocurrency known as Squid Game Token grew famous because of being connected to “Squid Game,” a well-known Netflix series. It turned out to be nothing other than a scam and its investors lost millions of dollars.<sup>460</sup>

---

<sup>458</sup> Pawan Nahar, *Bitcoin enters teenage, turns Rs 1,000 in Rs 76.4 cr in 13 years*, THE ECONOMIC TIMES, <https://economictimes.indiatimes.com/markets/cryptocurrency/bitcoin-enters-teenage-turns-rs-1000-in-rs-76-4-cr-in-13-years/articleshow/88684799.cms> (last updated Jan. 4, 2022, 1:12 PM).

<sup>459</sup> Viraj Gaur, *BitConnect: Revisiting the \$2.4 Billion Crypto Scam as Founder Flees India*, THE QUINT (Mar. 3, 2022, 4:18 PM), <https://www.thequint.com/tech-and-auto/tech-news/bitconnect-revisiting-the-24-billion-crypto-scam-as-founder-flees-india>.

<sup>460</sup> BBC News, *Squid Game crypto token collapses in apparent scam*, BBC NEWS (Nov. 2, 2021), <https://www.bbc.com/news/business-59129466>.

The project developers vanished into thin air and tokens became worthless.<sup>461</sup>

**BitConnect:** BitConnect was a cryptocurrency program that promised investors enormous profits stemming from lending and trading platform. However, project was discovered as Ponzi scheme when the value of token dropped leading to billions loss to investors.

**OneCoin:** OneCoin was a cryptocurrency scheme that claimed it had blockchain technology behind it and promised high returns for its investors. However, it finally appeared that it was operating under a pyramid scheme after its founders were nabbed for fraud.<sup>462</sup> It is estimated that investors lost approximately \$4 billion in this way.

**Prodeum:** Prodeum started with claiming to develop blockchain-based platform for agricultural industry. But soon enough everyone understood they cheated on them, all just like many other projects whose creators disappeared after collecting money from the clients.<sup>463</sup>

**PlusToken:** PlusToken became a crypto wallet as well as exchange which assured high returns to whoever deposited their monies there. Eventually, it was transpired that this turned out to be another Ponzi scheme due to a crack-down on founders' operations.<sup>464</sup>

As a matter of fact, it is crucial to carry out extensive research and proper due diligence before one invests in any cryptocurrency

<sup>461</sup> CNBCTV18.com, *Squid Game scam: Everything you should know*, CNBC (Nov. 8, 2021), <https://www.cnbctv18.com/cryptocurrency/squid-game-scam-everything-you-should-know-11380272.htm>.

<sup>462</sup> Press Release, Department of Justice, Co-Founder Of Multi-Billion-Dollar Cryptocurrency Pyramid Scheme "OneCoin" Pleads Guilty (Dec. 16, 2022), <https://www.justice.gov/opa/pr/bitconnect-founder-indicted-global-24-billion-cryptocurrency-scheme>.

<sup>463</sup> Becky Peterson, *A crypto startup that vanished and changed its website to the word 'penis' allegedly stole the identities of its team*, BUSINESS INSIDER INDIA (Jan. 30, 2018), <https://www.businessinsider.in/tech/a-crypto-startup-that-vanished-and-changed-its-website-to-the-word-penis-allegedly-stole-the-identities-of-its-team/articleshow/62702230.cms>.

<sup>464</sup> Tanzeel Akhtar, *Ringleaders of PlusToken Scam Jailed for Up to 11 Years*, NASDAQ (Dec. 1, 2020, 8:15 AM), <https://www.nasdaq.com/articles/ringleaders-of-plustoken-scam-jailed-for-up-to-11-years-2020-12-01>.

project. Investors should consider looking for projects with strong teams, well-defined roadmaps and a product or prototype that works. They should also be cautious of projects that promise high returns with little risk.

## **8.4 Bitcoin: The Gateway to Understanding the Entire Crypto Space**

Bitcoin has been the most famous and widely accepted cryptocurrency since it was created in 2009. As the first digital currency without central authority, Bitcoin has influenced the whole development of the comprehensive crypto ecosystem. The influence of bitcoin on crypto ecosystem is highly substantial because being a mother cryptocurrency, its success led to the development of other cryptocurrencies as well as other blockchain based projects.

Decentralization characteristic of Bitcoin entails a network of nodes verifying transactions instead of using centralized authorities, thereby challenging the conventionally centered financial systems. Decentralized finance (DeFi), for instance, has extended this concept to other areas, where decentralized protocols are being developed to enable various financial activities without middlemen. Bitcoin's success also contributed to the rise of blockchain technology that is now finding applications in different industries other than finance like healthcare, supply chain management and identity verification.

The crypto ecosystem enjoys a number of benefits from the Bitcoin's peculiar qualities. First among these is, its decentralization characteristic which makes it immune from censorship or takeover, since it is not under any government control or controlled by any financial institution, making it a reliable store of value for those who seek security. The second reason for scarcity is the limited supply of 21 million bitcoins, thus ensuring the bitcoin's value, stability and preventing inflationary pressures. Its rarity makes it an enduring investment option in comparison with traditional assets and hence the most trusted way to safely invest funds in future years with low risks involved. Portability is another important aspect of Bitcoin. It is a cryptocurrency and can be transferred from one part of the world to another, which makes it useful for cross-border payments and

international trade. Bitcoin is ultimately secure, thanks to its use of advanced cryptographic algorithms that safeguards the transactions as well as user identities.

Finance and technology have been greatly affected by Bitcoin since its inception. This has challenged traditional financial systems because it provides an alternative model which is decentralized and transparently performs operations that are highly secure at a low cost. The success of Bitcoin has also led to the rise of other cryptocurrencies such as Ethereum, Ripple, Litecoin among others with different unique characteristics and benefits. Moreover, the advent of DeFi was driven by the success of Bitcoin in building on blockchain technology. DeFi protocols provide various financial services such as lending, borrowing or trading without intermediaries like banks or other financial institutions. In conclusion, the importance of Bitcoin in the crypto ecosystem is foremost and vital. It's decentralized characteristic, limited supply, transferable and safe nature led to the introduction and development of other cryptocurrencies, blockchain technology as well as DeFi. The traditional financial systems were disrupted by bitcoin which has opened up a new avenue for innovation and growth. Understanding Bitcoin is very crucial, if one wishes to understand the rest of the crypto ecosystem and what it could mean for the future generations.

## **8.5 Ethereum: The Driving Force Behind Web3 and Decentralization**

Since its inception in 2015, Ethereum has been on the leading edge of blockchain innovation and that has evolved into a new era in decentralized applications (dApps) and smart contracts. This implies that Ethereum has not only transformed our understanding about cryptocurrency but also paved way for a new internet version, popularly known as 'Web3'. The decentralized web, also known as Web3, is a new internet paradigm that provides users with the ability to control their data in a more effective way and interact with decentralized applications on blockchain technology.<sup>465</sup> Whereby,

---

<sup>465</sup> Dan Ashmore, *A Brief History Of Web 3.0*, FORBES ADVISOR (Aug. 26, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-is-web-3-0/>.

Web2 paradigm users have to depend upon centralized intermediaries for data storage and application accessibility while Web3 employs the power of the blockchain so as to achieve a decentralised infrastructure, thereby eliminating intermediation.<sup>466</sup> In the Web3 ecosystem, users have full control over their data and can access dApps that are based on blockchain technology that offers high levels of transparency, security, and trust. Thus, through Web3, power has been restored back in the hands of users, enabling them to participate in a distributed economy directly without having middlemen.

Ethereum is a type of blockchain platform that was created specifically for building dApps as well as smart contracts. Solidity was introduced as a new programming language allowing developers to write the smart contracts which could be executed by Ethereum Virtual Machine (EVM). The Ethereum Virtual Machine is a decentralized virtual machine that runs on the Ethereum blockchain and enables the smart contract execution.<sup>467</sup> In other words, developers can build dApps that are not centralized, which means they do not depend on any central authority or intermediaries to function. Instead, the intelligence is scripted into the smart contract and then executed in EVM.

The backbones of Web3 ecosystem by Ethereum include its smart contracts which enable development of decentralised applications without intermediaries. Thereby, they offer high levels of security, transparency, as well as trust, thus ensuring users confidence when interacting with these dApps. Additionally, Ether (ETH), Ethereum's native coin serves as gas fees for the network, thereby enabling users to pay for the transactions and also interact with dApps. Ether is also used to incentivize those participating in the network like miners and validators who keeps its security plus stability.

---

<sup>466</sup> Steven Ehrlich, *What Is Web3?*, FORBES (Mar. 10, 2023), <https://www.forbes.com/sites/digital-assets/article/what-is-web3/?sh=12476f067a43>.

<sup>467</sup> *What Is the Ethereum Virtual Machine & How Does It Work?*, HEDERA, <https://hedera.com/learning/smart-contracts/ethereum-virtual-machine> (last visited Mar. 28, 2023).

Though still nascent, Web 3 has the potential to redefine that how we should experience the web. The rise of decentralized applications built on blockchain technology signifies a new digital economy that is based on inherent transparency, security and inclusivity. While Ethereum has been instrumental in making Web3 possible, there are other platforms in this space as well. Additionally, other blockchain platforms such as Polkadot, Cosmos and Solana have also participated in the development of Web3 and expansion of its respective possibilities. It can be concluded that Ethereum is more than just a cryptocurrency. It is a platform which has transformed our understanding of decentralized applications as well as smart contracts. These days, users can take control of their data by using Ethereum's Web3 technology that enables them to participate in a decentralized economy without relying on intermediaries.

## **8.6 Meme Coins: A Cultural Phenomenon or Fad?**

Fun coins or tokens, also called as “meme coins or memetic coins” are arguably the most popular trend in the entire cryptocurrency market. Initially, they were created for comic or satirical reasons. these currencies often rise via social media and internet forums. They have gained a lot of popularity because they are cheap and they generally offers high potential for returns and are majorly driven by their communities. The first ever meme coin to gain the widespread acceptance was Dogecoin, which Billy Markus and Jackson Palmer created as a joke in 2013, based on the popular “Doge” meme from the internet. Despite its initial non seriousness, dogecoin quickly attracted the follower-ship & later on became one of the top performing cryptocurrencies of all time. It's popularity has varied since then with major spikes in 2017 and 2021 due to social media buzzes and endorsements by famous people such as Elon Musk.

Numerous other meme coins have now come up after the Dogecoin hit big. Many such tokens includes Shiba Inu (SHIB), Babydoge Coin (BABYDOGE), Folk Inu (FLOKI), etc. These cryptocurrencies often advertise themselves as being community driven cryptocurrencies while emphasizing upon decentralization and inclusivity. Moreover, meme coins have become a popular way for

people to participate in the cryptocurrency market without investing large sums of money. Often, they have low market caps and low prices, allowing them find their way into the hands of a wider range of investors. Furthermore, these types of coins appeal to individuals that are interested in the decentralization of finance and democratizing investment opportunities. Nonetheless, meme coins also impose significant risks. They are often created as a joke and they may lack any clear use case or value proposition beyond the mere humor. This makes them highly volatile and prone to market manipulation. Also, such digital currencies may not possess strong development teams or technical foundations and that makes them susceptible to hacking or other security breaches.

Furthermore, the emergence of meme coins has triggered the conversations among crypto players about the influence of social media and internet culture on the market. On one hand, there are investors who think that the hype surrounding the meme coins is indicative for larger speculation and manipulation problems, while on the other hand, others perceive it as something positive which advances innovation by allowing new entrants into this area. Meme coins are now having a major presence in the crypto sphere and they have won over investors and enthusiasts. In as much as this is a unique way for people to get involved in the market or promote decentralization and inclusivity in a fun engaging manner, it also comes up with the significant risks that should be handled cautiously.

## 8.7 NFTs: A Disruptive Innovation or a Passing Bubble?

In the recent times, the subject matter of NFTs that is commonly known as Non-fungible tokens have become very popular worldwide.<sup>468</sup> These digital assets are distinct from each other and cannot be swapped for another asset of similar value. They are kept on blockchains and often represent digital arts, collectibles among others in peculiar ways. Some say that the hype surrounding NFTs is

---

<sup>468</sup> Robyn Conti & John Schmidt, *What Is An NFT? How Do NFTs Work?*, FORBES ADVISOR, <https://www.forbes.com/advisor/in/investing/cryptocurrency/what-is-an-nft-how-do-nfts-work/> (last updated Sept. 16, 2022).

similar to what was experienced during cryptocurrency boom almost 4 years ago, but many still doubt their long-term viability.

As a concept, Non-fungible Tokens are not new, but they only became popular in early 2021. This was mainly due to some highly publicized sale events like the record breaking \$69 million spent at Christie's auction house by Beeple for his art piece, "The First 5000 Days".<sup>469</sup> Others include video clip of LeBron James dunking sold for \$208,000 and Jack Dorsey's first tweet retailed at \$2.9 million. Partly their special attributes have contributed to the sudden surge in popularity of NFTs. They are different from the cryptocurrencies that can change hands with one another but no two NFTs are alike. Therefore, they are well suited as an avenue for selling unique digital assets such as music files or artwork paintings. There is characteristically no limit to what can be done with this unique token apart from developing smart contracts that spell out certain terms and conditions that could restrict access to these artworks or provide future return for their creators during subsequent sales.

Art world, music industry and sports memorabilia markets are some of the industries that NFTs can potentially disrupt.<sup>470</sup> Instead of picturing a traditional artist selling paintings in an art gallery or a musician producing CD for sale, it becomes possible imagining artists selling their digital creations directly to buyers as unique assets. It is specially helpful for all those musicians and artists who do not find it easy to make money out of their work. Moreover, gaming industry could also experience some new potential changes through these disrupting techniques because they are well placed to signify items within games and scarce collectibles. Therefore, game creators may also earn from their works while players can get hold of valuable

---

<sup>469</sup> Abram Brown, *Beeple NFT Sells For \$69.3 Million, Becoming Most-Expensive Ever*, FORBES (Mar. 11, 2021), <https://www.forbes.com/sites/abrambrown/2021/03/11/beeple-art-sells-for-693-million-becoming-most-expensive-nft-ever/?sh=2acc87062448>.

<sup>470</sup> Smita Tripathi, *How NFTs are Disrupting the Art World*, BUSINESS TODAY (Feb. 20, 2022), <https://www.businesstoday.in/magazine/luxury-lifestyle/story/how-nfts-are-disrupting-the-art-world-321706-2022-02-15>.

objects that will have increasing value with time.<sup>471</sup> NFTs might change our understanding on how ownership should be viewed, especially during the ongoing digital era. As more aspects of our lives go online, we can now really own our digital properties.

However, the current hype around NFTs is viewed by many experts as unsustainable, though they have potential gains.<sup>472</sup> As in the case of cryptocurrency boom in 2017, some people thought that we are experiencing a bubble for NFTs. There are several reasons behind this. The first reason is that currently, the NFTs market is largely speculative. Numerous NFTs are being bought and sold because of their possible resale value and not because they have intrinsic worth. This has resulted to several NFTs being sold at astronomical prices which was definitely beyond their real values. Another concern is the environmental consequences of NFTs. This is because, just like other forms of cryptocurrencies, especially the NFTs that utilises the Proof-of-Work (PoW) Consensus are created and stored on the blockchain which needs a lot energy.<sup>473</sup> This has consequently caused uproar from ecological organizations who argue that such consumption related to non-fungible tokens cannot be sustained. Furthermore, there exists anxiety on the lack of regulation within the NFT marketplace. Such an absence of the regulations pertaining to the subject matter of NFTs pose a reasonable and genuine threat to the investors of this particular space.

## 8.8 Staking in Crypto: A Passive Income Opportunity

Staking is a concept in cryptocurrency ecosystem whereby holders of specific type of cryptocurrency participates in the decision

---

<sup>471</sup> Dhiraphol Suwanprateep, *NFTs: Disruption, Transformation and Opportunities*, BAKER MCKENZIE, <https://www.bakermckenzie.com/en/insight/publications/2022/01/nfts-disruption-transformation-opportunities> (last visited Mar. 28, 2023).

<sup>472</sup> CNBCTV18.com, *What is the NFT bubble?*, CNBC, <https://www.cnbctv18.com/cryptocurrency/what-is-the-nft-bubble-14869071.htm> (last updated Oct. 4, 2022).

<sup>473</sup> Gregory Barber, *NFTs Are Hot. So Is Their Effect on the Earth's Climate*, WIRED (Mar. 6, 2021), <https://www.wired.com/story/nfts-hot-effect-earth-climate/>.

making on the blockchain network and they earn rewards as well.<sup>474</sup> It is different from traditional mining which requires powerful computers and consumes a lot of energy and therefore staking could be considered as an alternative method for validating transactions and adding new blocks to the blockchain that consume less energy and are environmentally friendly as compared to the mining of the cryptocurrencies. Moreover, it is a process of locking up a certain volume of cryptocurrency as collateral, and this validation helps in the facilitation of transactions on the network. The ultimate aim is to ensure that no one can alter blockchain history, thus ensuring a secure network. Stakers are therefore rewarded with more cryptocurrency by virtue of staking an amount of cryptocurrency held by them. Additionally, such a mechanism also provide a platform to the investor of cryptocurrency for some reasonable returns on his investments, as his assets will not be kept idle while just simply holding them.

Proof-of-stake (PoS) consensus algorithms make staking possible. PoS is a mechanism used by decentralised networks to reach consensus without relying on miners who need to solve complicated mathematical problems before appending new blocks into the blockchain. Instead, validators are required to add a block based on their stake in form of tokens. Some of the notable examples in this regard could be of Ethereum 2.0, where Ethereum launched its long-awaited upgrade, Ethereum 2.0, which introduced staking into the system in December 2020.<sup>475</sup> Users under Ethereum 2.0 get an opportunity to stake their ETH tokens and be given bonuses for verifying transactions made over the network. The ethereum network currently has over 8 million ETHs worth more than \$18 billion that have been staked up till now. The Binance Smart Chain (BSC) introduced by the Binance cryptocurrency exchange is another example. Using a proof-of-stake consensus algorithm, BSC enables

---

<sup>474</sup> Hannah Lang & Elizabeth Howcroft, *Explainer: What is 'staking,' the cryptocurrency practice in regulators' crosshairs?*, REUTERS (Feb. 10, 2023), <https://www.reuters.com/business/finance/what-is-staking-cryptocurrency-practice-regulators-crosshairs-2023-02-10/>.

<sup>475</sup> Merav Ozair, *Staking Ethereum (ETH): How to Do It, and the Pros and Cons*, NASDAQ (Oct. 5, 2022, 10:22 AM), <https://www.nasdaq.com/articles/ringleaders-of-plustoken-scam-jailed-for-up-to-11-years-2020-12-01>.

holders of Binance Coin (BNB) to gain an extra income for verifying transactions on this network. As of February 2022, more than 29 million BNB tokens were staked on BSC network with over \$15 billion USD being worth. Other well-known instances are of Cardano (ADA), Polkadot (DOT) and Solana (SOL), whose number of users who stake their tokens to get rewards and the support to their respective blockchain network has increased significantly. All in all, staking has gradually become a favourite practice among crypto investors looking to generate passive income, while promoting security and decentralization in blockchain networks.

Staking within the world of cryptos is now successful because it allows individuals to earn rewards, thus offering some form of security in the blockchain network.<sup>476</sup> Ethereum, Cardano and Polkadot have been involved in various projects that have implemented staking. The Ethereum 2.0 update which involved the adoption of a different staking mechanism called as Proof of Stake (PoS) is one example of many successful stakings. In this system, validators are able to stake some amount of Ether so as to be able to participate in block validation and earn incentives. This encourages validators to always act for the good of the network otherwise they would lose their stake.

Cardano blockchain is yet another example which succeeded in securing its network through staking. This variant is known as Ouroboros on Cardano and it involves randomly choosing validators who validate blocks with probabilities proportional to their ADA stakes. It ensures that validator's interests are aligned with network's best interests.

Polkadot also employs staking as a security measure for its network. Stakers can bond their DOT tokens, turning themselves into either validators or nominators, hence earning rewards within the Polkadot ecosystem. Validators are the key players that integrate additional chains, whereas nominators help identify the reliable validators. Therefore, this helps maintain network integrity and

---

<sup>476</sup> Sam Becker, *What to know about staking — the process of locking up crypto holdings to earn rewards and interest*, BUSINESS INSIDER, <https://www.businessinsider.com/personal-finance/staking-crypto?IR=T> (last updated July 12, 2022).

security. Staking has proven to be an effective way of encouraging people to use the blockchain and keeping it secure. It's probably going to become one of the important aspects of crypto ecosystem in the longer run as more projects start implementing staking mechanisms.

## 8.9 Crypto Burning: Reducing Supply, Boosting Value

Crypto ecosystem uses a term called as burning which refers to a process of destroying coins or tokens by sending them into an address from where they cannot be recovered. Developers of cryptocurrency projects often burn tokens or coins in an attempt to reduce their supply and thus raise their value. Burning is one of the most common strategies employed by crypto projects for token supply management and maintenance of its value. If some portion of the overall supply is burnt, then it means that there will be less supply in the circulation. This makes the remaining tokens more rare, which can lead to increase in their outstanding value. Burning can also help to delete unneeded tokens or take out any wrongfully issued ones.

Tokens or coins are sent through this burning process to an address where they cannot be redeemed from. In most cases, the address is a smart contract that allows incoming tokens or coins but doesn't allow them to be spent or transferred further. Whenever tokens or coins are sent to this address, they will no longer be available for circulation as such they can't serve any purpose. Some of the prominent examples with respect to the burning process or mechanisms are as follow:

**Binance Coin (BNB):** Binance Coin is the native token of Binance exchange, one of the world's largest cryptocurrency exchanges in terms of trading volumes. As part of its token management strategy, Binance burns some of its BNB tokens periodically. Generally, at the end of every quarter, Binance burns a portion of total supply of BNB depending on the trading volume on Binance platform. The act of burning helps reduce the amount in circulation, hence increasing value of remaining tokens.

**Tron (TRX):** This is a blockchain-oriented resource aimed at developing dApps. In its overall management of tokens, Tron always

burns part of its TRX tokens.<sup>477</sup> This burning process thus involves buying back its own TRX tokens from the market using some portion of transaction fees generated by the network and burning them afterwards. Through the act of burning, Tron aims at reducing the total supply of TRX, thus making the remaining ones more valuable.

**Bitcoin (BTC):** Bitcoin has no official protocol for burning coins but they are effectively burned over time since some bitcoins get lost or destroyed. It is estimated that as much as 20% out of all Bitcoins ever created have been misplaced or destroyed through lost private keys, hardware failures among other means, this translates to losing about 20%, that's why bitcoin might be considered scarce.

**Ripple (XRP):** Ripple is the company behind the XRP token, and it occasionally burns large amounts of XRP as part of its overall token management strategy. In 2021, Ripple made a public announcement that it would suspend its token sales program and instead use its XRP holdings to help grow more into its ecosystem. As part of implementing this approach, over 45 billion XRP tokens were burnt by Ripple in essence, reducing the number of total XRP coins by almost half.

Burning is a popular strategy employed by crypto projects for managing their tokens supply as well as protecting their value. When the circulating supply of tokens or coins is reduced, then those remaining can appreciate in value because there are fewer of them that is actually left in the circulation. Although not all digital currencies burn their tokens in managing them, but many-a-times it is believed that burning plays an essential role in the life cycle of a project supporting sustainable growth and prosperity. Additionally, the subject matter of burning has been much successful up to now with many projects adopting it to reduce supply and increase the demand for their tokens. One such example is Binance Coin (BNB), where they have implemented a token burn mechanism that involves buying back some of the tokens every quarter and destroying them.

---

<sup>477</sup> Nellius Irene, *Tron Burn Total Exceeds 11 Billion TRX*, THE CRYPTO BASIC (Sept. 2, 2022), <https://thecryptobasic.com/2022/09/02/tron-burn-total-exceeds-11-billion-trx/>.

Value of BNB has therefore gone up, at the same time as circulation of its supply has decreased.

Another instance of success in this area involves Ethereum Improvement Proposal (EIP) 1559 which was deployed in August 2021 leading to the burning down of Ethereum tokens. This proposal aims at reducing overall ether supply through introducing a transaction fee burning mechanism.<sup>478</sup> For instance, when one sends a transaction on the Ethereum network then the part of what he/ she pays as fees will be burnt thereby, bringing about deflation of ether supplies over time. It is projected that Ethereum's price will go up due to this, while also making its network efficient by eliminating congestion in transactions. Moreover, to increase the value of their tokens, other projects like TRON have also adopted mechanisms for token burning. Since implementing its token burning mechanism in 2018, TRON has burned over 9 billion of its tokens which has consequently raised the value of TRON. Burning concept at large has so far been successful, as it reduces tokens' overall supply. Hence, burning increasing their values and can improve the network's efficiency. Nevertheless, it is worth noting that token burning should be done responsibly in a very transparent manner in order to ensure that investors and users are not adversely affected.

## 8.10 ICO (Initial Coin Offering): Fueling Innovation in the Crypto World

Initial Coin Offering (ICO) is a process that takes place on the crypto ecosystem where new crypto assets are offered in exchange for cryptocurrencies such as Bitcoin or Ethereum to the investors.<sup>479</sup> Blockchain-based startups often resort to ICOs as a means of securing funds for their projects, instead of seeking conventional venture capital financing. An Initial Coin Offering (ICO) is an event where crowdfunding serves as the base for creating new digital

---

<sup>478</sup> *What is EIP 1559?*, BITCOIN.COM, <https://news.bitcoin.com/the-crucible-of-privacy-why-decentralized-exchange-is-the-only-way/> (last visited Mar. 28, 2023).

<sup>479</sup> *What Are ICOs and How Do They Work?*, SMITH GAMBRELL RUSSELL, <https://www.sgrlaw.com/what-are-icos-and-how-do-they-work/> (last visited Mar. 28, 2023).

currencies or tokens.<sup>480</sup> Investors are given a chance to buy company or project issued tokens/coins which they expect will have value and later on they may use them in future project features/ services.

Some of the successful ICOs in the crypto ecosystem includes:

**Ethereum (ETH):** In 2014, Ethereum raised over \$18 million from its ICO, which funded the development of its blockchain and ecosystem.<sup>481</sup>

**EOS (EOS):** In 2018, EOS completed its yearly ICO which saw it amass \$4 billion.<sup>482</sup> The project plans to develop a blockchain platform that is scalable and easy to use.

**Filecoin (FIL):** Filecoin reached one of the biggest ICO at a time with an amount of \$257 million in 2017. The project aims to provide a decentralized storage solution.

**Tezos (XTZ):** In 2017, Tezos' ICO raised \$232 million, which was meant for developing a self-amending blockchain that can change over time.

**Basic Attention Token (BAT):** A sum of \$35 million was raised by Basic Attention Token during its ICO in 2017. The project aims at enhancing digital advertising environment by rewarding users for their attention and providing the advertisers more visibility.<sup>483</sup>

While many Blockchain projects have been able to raise funds through ICOs, there have also been cases where scams and frauds were reported. Some ICOs have promised more than they could deliver and that has led to loss of stakeholders money investments. As such, numerous countries have introduced mechanisms that would

---

<sup>480</sup> Jake Frankenfield, *Initial Coin Offering (ICO): Coin Launch Defined, with Examples*, INVESTOPEDIA, <https://www.investopedia.com/terms/i/initial-coin-offering-ico.asp> (last updated Aug. 18, 2022).

<sup>481</sup> Vitalik Buterin, *Launching the Ether Sale*, ETHEREUM FOUNDATION BLOG (July 22, 2014), <https://blog.ethereum.org/2014/07/22/launching-the-ether-sale>.

<sup>482</sup> Kate Rooney, *A blockchain start-up just raised \$4 billion without a live product*, CNBC (May 31, 2018, 12:26 PM), <https://www.cnn.com/2018/05/31/a-blockchain-start-up-just-raised-4-billion-without-a-live-product.html>.

<sup>483</sup> Jonathan Keane, *\$35 Million in 30 Seconds: Token Sale for Internet Browser Brave Sells Out*, COINDESK (May 31, 2017, 10:10 PM), <https://www.coindesk.com/markets/2017/05/31/35-million-in-30-seconds-token-sale-for-internet-browser-brave-sells-out/>.

safeguard investors who indulge in this market or prevent fraudulent activities from taking place during any Initial Coin Offering campaigns. As a matter of fact, cryptocurrency industry has seen both successes and polemics of ICOs. First, they have acted as a great way to raise money for many successful blockchain projects while on the other side there have been several incidents of fraud and scams related to ICOs. A number of ICOs have promised high returns on investment but failed to deliver, leading to significant losses for investors. Some of the examples in this regard includes:

**BitConnect:** During its ICO, BitConnect managed to raise \$2.5 billion by promising investors high returns through their lending platform. However, it turned out that this was a classic example of Ponzi scheme, which led its token into oblivion.

**OneCoin:** One Coin with over \$4 billion raised during its initial coin offering claimed itself as genuine cryptocurrency, arguably while actually being just another fraud project whose founders were eventually arrested and charged with fraudulence.

**Centra Tech:** This company raised \$32 million in an initial coin offering (ICO) on the basis of its claim to be creating a cryptocurrency debit card. Nevertheless, the project turned out to be a scam and its founders faced charges of securities fraud.

In general, while Initial Coin Offerings have proven successful at raising funds for many blockchain projects, there are risks that investors should consider before investing in ICOs. Always investigate about the project and the team behind it before giving away your hard earned cash.

## 8.11 Decoding Trading Charts: A Must-Know for Crypto Traders

Trading graphs and charts are important tools for analyzing and making investment decisions in the cryptocurrency market. These tools help traders understand market trends, identify patterns as well as make predictions on possible price movements of different cryptocurrencies. The following are some of their roles during crypto trading:

**Trend Analysis:** Trading graphs and charts assist traders in determining whether a particular cryptocurrency is trending or not.<sup>484</sup> By observing how prices have been moving over time, it becomes easier for traders to tell that in which direction the market is going. If prices are going up, it means that we are in a bull trend hence long positions can be taken by sellers. Conversely, if prices go down they are going into a bearish trend then this shows that it is time to consider short trades.

**Pattern Recognition:** Additionally, trading graphs and charts are useful for traders, since they enable them to detect the price changes of cryptocurrencies. These patterns can be bullish or bearish and allow traders to make their own decisions. Head and shoulders, cup-and-handle, double top and double bottom are some commonly known patterns with respect to the crypto trading charts and patterns.

**Support and Resistance Levels:** On top of that, trading graphs and charts can be employed for discovering the support as well as resistance levels. Support levels are prices at which downward pressure is so strong that further price fall is halted, while resistance levels are prices at which upward pressure is so strong that further price rise is halted. Traders can use these levels as possible entry or exit points for their trades.

**Volume Analysis:** Another significance of trading graphs and charts is that they show the volume of transactions made in a given cryptocurrency. By looking at the trading volume, traders can know whether the market trend is strong or not. If trade volumes are high then there tends to be a strong trend and if the volumes are low then it usually indicates weak trends in the market.

**Timeframes:** Graphs and charts for trading, provide traders with various time frames to select from, ranging from minutes to months.<sup>485</sup> These time frames can be used by traders to examine the price movements of a cryptocurrency within a given period.

---

<sup>484</sup> *How to read Crypto charts?*, MONEYCONTROL, <https://www.moneycontrol.com/msite/wazirx-cryptocontrol-articles/how-to-read-crypto-charts/> (last visited Mar. 28, 2023).

<sup>485</sup> Jeffrey Craig, *How To Trade Crypto With Multiple Time Frame Analysis*, PHEMEX (June 11, 2021), <https://phemex.com/academy/how-to-use-multiple-time-frame-analysis>.

In addition to that, technical analysis also helps in identifying patterns and trend in price movements and that could eventually influence buying or selling decisions done by the trader or investor, even though the market sentiments may also determine the direction of the market. Furthermore many trading systems have charting tools such as software applications that use indicators among other functions which are used by individual investors when making transaction calls in the crypto market. Also, technical analysis has been proven through various studies to predict the market direction. For instance, a study by the University of Economics in Prague discovered that technical analysis has predicted the direction of the Bitcoin prices over the short time frames. Nonetheless, it is crucial to mention that no trading strategy is perfect and crypto market is considered highly volatile and unpredictable. Prior to making any investment decisions, traders and investors should rely on multiple sources of information and conduct thorough and comprehensive research.





## References

1. Explained: Everything You Need to Know About Cryptocurrencies, The Times of India (Feb. 3, 2022), <https://timesofindia.indiatimes.com/business/cryptocurrency/bitcoin/explained-everything-you-need-to-know-about-cryptocurrencies/articleshow/88892520.cms> (last visited Mar. 26, 2023).
2. Contributors to Wikimedia Projects, Bitcoin, Wikipedia, The Free Encyclopedia (Mar. 8, 2009), [https://en.wikipedia.org/wiki/Bitcoin#cite\\_note-ageofcr-21](https://en.wikipedia.org/wiki/Bitcoin#cite_note-ageofcr-21) (last visited Mar. 20, 2023).
3. The Evolution of Cryptocurrencies in India and What the Future Looks Like, Times of India Blog (May 5, 2022), <https://timesofindia.indiatimes.com/blogs/voices/the-evolution-of-cryptocurrencies-in-india-and-what-the-future-looks-like/> (last visited Mar. 20, 2023).
4. Kinza Yasar & Lauren Horwitz, What Is a Digital Wallet and How Does It Work?, WhatIs.com (Aug. 25, 2022), <https://www.techtarget.com/whatis/definition/digital-wallet> (last visited Mar. 23, 2023).
5. Nikita Tambe, Advantages and Disadvantages of Cryptocurrency in 2023, Forbes Advisor India (Mar. 23, 2023), <https://www.forbes.com/advisor/in/investing/cryptocurrency/advantages-of-cryptocurrency/> (last visited Mar. 22, 2023).
6. The Ins and Outs of Decentralized Exchanges (DEXs), Hedera, <https://hedera.com/learning/decentralized-finance/decentralized-exchanges> (last visited Mar. 19, 2023).
7. The Evolution of Cryptocurrencies in India and What the Future Looks Like, Times of India Blog (May 5, 2022), <https://timesofindia.indiatimes.com/blogs/voices/the-evolution-of->

cryptocurrencies-in-india-and-what-the-future-looks-like/ (last visited Mar. 19, 2023).

8. PancakeSwap Price Prediction | Is PancakeSwap a Good Investment?, Capital.com, <https://capital.com/pancakeswap-cake-coin-price-prediction> (last visited Mar. 16, 2023).
9. Rahul Nambiapurath, PancakeSwap to Launch NFT Marketplace and PancakeSquad Collection on Sept 22, Yahoo Finance (Sept. 9, 2021), <https://finance.yahoo.com/news/pancakeswap-launch-nft-marketplace-pancakesquad-102106204.html> (last visited Mar. 20, 2023).
10. Contributors to Wikimedia Projects, Uniswap, Wikipedia, The Free Encyclopedia (Nov. 28, 2020), <https://en.wikipedia.org/wiki/Uniswap> (last visited Mar. 20, 2023).
11. Introducing UNI, Uniswap Protocol, <https://uniswap.org/blog/uni> (last visited Mar. 21, 2023).
12. Paddy Baker, Uniswap's Newly Launched UNI Token Has Already Doubled in Price, Coindesk: Bitcoin, Ethereum, Crypto News and Price Data (Sept. 18, 2020), <https://www.coindesk.com/markets/2020/09/18/uniswaps-newly-launched-uni-token-has-already-doubled-in-price/> (last visited Mar. 20, 2023).
13. Daniel Phillips & Ki Chong Tran, What is Uniswap? A Short Guide to the Token Swap Exchange, Decrypt (June 17, 2021), <https://decrypt.co/resources/what-is-uniswap/> (last visited Mar. 16, 2023).
14. What is Sushiswap?, Poloniex (Mar. 17, 2023), <https://medium.com/poloniex/what-is-sushiswap-890dbb848993> (last visited Mar. 14, 2023).
15. SushiSwap Review: Still Worth It? Everything We Found Out!!, Coin Bureau, <https://www.coinbureau.com/review/sushiswap-sushi/> (last visited Mar. 26, 2023).
16. SushiSwap and SUSHI Coin: Community-Driven LP Token, Gemini, <https://www.gemini.com/cryptopedia/sushiswap-sushi-coin-sushibar-chef-nomi> (last visited Mar. 26, 2023).
17. Liam J. Kelly, Sushi, Lido Finance Drop 10% as Top DeFi Tokens Plunge, Decrypt (Oct. 13, 2022), <https://decrypt.co/111844/sushi-lido-finance-drop-top-defi-tokens-plunge/> (last visited Mar. 26, 2023).

18. SushiSwap Plans Reveal Top-Heavy Side of DeFi Governance, PYMNTS.com (Oct. 5, 2022), <https://www.pymnts.com/cryptocurrency/2022/sushiswap-plans-reveal-top-heavy-side-of-defi-governance/> (last visited Mar. 21, 2023).
19. What is ShibaSwap and How Does It Work?, Crypto News, <https://cryptonews.com/exclusives/what-is-shibaswap.htm> (last visited Mar. 20, 2023).
20. Bybit Learn, What Is ShibaSwap? — and How to Use It, Bybit Learn (Dec. 28, 2022), <https://learn.bybit.com/defi/what-is-shibaswap/> (last visited Mar. 25, 2023).
21. Jordan Finneseth, Shiba Inu (SHIB) DEX ShibaSwap Surpasses \$1B TVL 24-hours After Launch, CoinTelegraph (July 7, 2021), <https://cointelegraph.com/news/shibu-inu-shib-dex-shibaswap-surpasses-1b-tvl-24-hours-after-launch> (last visited Mar. 18, 2023).
22. QuickSwap, QuickSwap, <https://quickswap.exchange/> (last visited Mar. 21, 2023).
23. What Is QuickSwap and How Does It Work?, Binance Feed, <https://www.binance.com/en-KZ/feed/post/43000> (last visited Mar. 22, 2023).
24. Bybit Learn, What Is QuickSwap – And How Does It Work?, Bybit Learn (Sept. 5, 2022), <https://learn.bybit.com/defi/what-is-quickswap-crypto/> (last visited Mar. 22, 2023).
25. Overview of Challenges of NFT Marketplaces and Introduction to Elixir, IJRASET, <https://www.ijraset.com/research-paper/overview-of-challenges-of-nft-marketplaces-and-introduction-to-elixir> (last visited Mar. 16, 2023).
26. Solana Vs. Polygon Vs. Ethereum – The Ultimate Comparison, Blockchain Council, <https://www.blockchain-council.org/blockchain/solana-vs-polygon-vs-ethereum/> (last visited Mar. 21, 2023).
27. Defining A Meme Coin: How Meme Coins Are Gaining Utility, Outlook India, <https://www.outlookindia.com/outlook-spotlight/defining-a-meme-coin-how-meme-coins-are-gaining-utility-news-214204> (last visited Mar. 23, 2023).
28. Grace Kay, The History of Dogecoin, the Cryptocurrency that Surged After Elon Musk Tweeted About It but Started as a Joke on Reddit Years Ago, Business Insider (Feb. 9, 2021),

- <https://www.businessinsider.com/what-is-dogecoin-2013-12> (last visited Mar. 21, 2023).
29. Contributors to Wikimedia Projects, Dogecoin, Wikipedia, The Free Encyclopedia (Dec. 14, 2013), <https://en.wikipedia.org/wiki/Dogecoin> (last visited Mar. 23, 2023).
  30. How Many Dogecoins Are There? | Total Number Of Dogecoins, Capital.com, <https://capital.com/how-many-dogecoins-are-there-in-the-world> (last visited Mar. 24, 2023).
  31. Alex Hern, It's Bobsleigh Time: Jamaican Team Raises \$25,000 in Dogecoin, The Guardian (Jan. 20, 2014), <https://www.theguardian.com/technology/2014/jan/20/jamaican-bobsled-team-raises-dogecoin-winter-olympics> (last visited Mar. 22, 2023).
  32. Taylor Locke, Elon Musk Continues to Tweet About Altcoins Like Baby Dogecoin—But Investors Should Tread Very Carefully, CNBC (July 13, 2021), <https://www.cnbc.com/2021/07/13/what-are-altcoins-elon-musk-tweets-about-baby-dogecoin-shiba-inu.html> (last visited Mar. 22, 2023).
  33. Jake Frankenfield, Cryptocurrency Explained With Pros and Cons for Investment, Investopedia (July 29, 2013), <https://www.investopedia.com/terms/c/cryptocurrency.asp> (last visited Mar. 23, 2023).
  34. Albi Nani, The Doge Worth 88 Billion Dollars: A Case Study of Dogecoin, Convergence: The International Journal of Research Into New Media Technologies, <https://doi.org/10.1177/13548565211070417> (last visited Mar. 22, 2023).
  35. The Investopedia Team, What Is Shiba Inu (SHIB) in Cryptocurrency, and How Does It Work?, Investopedia (Nov. 1, 2021), <https://www.investopedia.com/shiba-inu-shib-5207903> (last visited Mar. 22, 2023).
  36. Shiba Inu Beats Bitcoin In Popularity In 2021; Gets 43 Million More Views, Outlook India, <https://www.outlookindia.com/website/story/shiba-inu-beats-bitcoin-in-popularity-in-2021-gets-43-million-more-views/407231> (last visited Mar. 26, 2023).
  37. The Investopedia Team, Around 41% of Shiba Inu's Total Supply is Burned, Business Insider (Sept. 6, 2022), <https://www.businessinsider.in/cryptocurrency/news/10-shiba-inu->

coin-holders-own-71-of-the-meme-tokens-total-supply/articleshow/87347866.cms (last visited Mar. 24, 2023).

38. Manas Tiwari, What Is Baby Doge? Meet Elon Musk's New Favourite Cryptocurrency, India Today (July 2, 2021), <https://www.indiatoday.in/technology/news/story/what-is-baby-doge-meet-elon-musk-s-new-favourite-cryptocurrency-1823020-2021-07-02> (last visited Mar. 26, 2023).
39. Scott Jeffries, Baby Doge Coin (BabyDoge): What It Is, What It's Worth and Whether You Should Invest, Nasdaq (Sept. 15, 2022), <https://www.nasdaq.com/articles/baby-doge-coin-babydoge:-what-it-is-what-its-worth-and-whether-you-should-invest> (last visited Mar. 22, 2023).
40. Baby Doge Coin Price | BabyDoge Price Index, Live Chart and INR Converter, Binance, <https://www.binance.com/en-IN/price/baby-doge-coin> (last visited Mar. 26, 2023).
41. Introduction of Digital Assets, Huobi, <https://www.huobi.com/en-in/asset-introduction> (last visited Mar. 22, 2023).
42. Jeff Benson, Chinese Exile With Ties to Steve Bannon to Pay SEC \$539M Over G-Coins ICO, Decrypt (Sept. 13, 2021), <https://decrypt.co/80839/chinese-exile-ties-steve-bannon-pay-sec-539-g-coins-ico/> (last visited Mar. 26, 2023).
43. Floki Inu Price To Pump With CRO Listing, While This New Meme Coins Presale Explodes, Outlook India (Mar. 24, 2023), <https://www.outlookindia.com/outlook-spotlight/floki-inu-price-to-pump-with-cro-listing-while-this-new-meme-coins-presale-explodes-news-272627> (last visited Mar. 20, 2023).
44. Get to Know Floki in This Overview Video About 'The People's Currency', BSC News (Jan. 13, 2023), <https://www.bsc.news/post/get-to-know-floki-in-this-overview-video-about-the-peoples-currency> (last visited Mar. 22, 2023).
45. Grab Your Piece of the Pie: Sector Finance Token is Set For Launch, BSC News (Mar. 21, 2023), <https://www.bsc.news/post/grab-your-piece-of-the-pie-sector-finance-token-is-set-for-launch> (last visited Mar. 26, 2023).
46. TheNewsCrypto on Binance Feed: Top Trending Cryptocurrencies of the Week, Binance Feed (Mar. 3, 2023), <https://www.binance.com/en-IN/feed/post/268137> (last visited Mar. 22, 2023).

47. Siamak Masnavi, Floki Inu (\$FLOKI) Completes Phase 1 of Its DAO Upgrade, CryptoGlobe (Jan. 23, 2022), <https://www.cryptoglobe.com/latest/2022/01/floki-inu-floki-completes-phase-1-of-its-dao-upgrade/> (last visited Mar. 15, 2023).
48. What Is Dogelon Mars? A DOGE-ELON Coin Hybrid, Gemini (Feb. 24, 2022), <https://www.gemini.com/cryptopedia/what-is-dogelon-mars-crypto-meme-coin-elon-token> (last visited Mar. 21, 2023).
49. Nicole Willing, Dogelon Mars Price Prediction | Is Dogelon Mars a Good Investment?, Capital.com (Dec. 12, 2022), <https://capital.com/dogelon-mars-elon-price-prediction> (last visited Mar. 20, 2023).
50. Social Network for Programmers and Developers, Morioh, <https://morioh.com/p/4e168c7d9459> (last visited Mar. 21, 2023).
51. Disha Sinha, Dogelon (ELON) is After SHIB and DOGE! Can It be the Next Big Meme Coin?, Analytics Insight (Aug. 2, 2022), <https://www.analyticsinsight.net/dogelon-elon-is-after-shib-and-doge-can-it-be-the-next-big-meme-coin/> (last visited Mar. 21, 2023).
52. What is Blockchain Technology - IBM Blockchain, IBM, <https://www.ibm.com/topics/blockchain> (last visited Mar. 22, 2023).
53. Making Sense of Bitcoin, Cryptocurrency, and Blockchain, PWC, <https://www.pwc.com/us/en/industries/financial-services/fintech/bitcoin-blockchain-cryptocurrency.html> (last visited Mar. 22, 2023).
54. Alexander S. Gillis, What is Bitcoin and How Does It Work?, WhatIs.com (Nov. 15, 2021), <https://www.techtarget.com/whatis/definition/Bitcoin> (last visited Mar. 20, 2023).
55. Explained: What Happens When All 21 Million Bitcoins Are Mined, CNBCTV18.com (Dec. 26, 2021), <https://www.cnbctv18.com/cryptocurrency/explained-what-happens-when-all-21-million-bitcoins-are-mined-11886092.htm> (last visited Mar. 20, 2023).
56. Kim Lachance Shandrow, 5 Reasons Merchants Should Start Accepting Bitcoin Now, Entrepreneur (Sept. 4, 2014), <https://www.entrepreneur.com/money-finance/5-reasons-merchants-should-start-accepting-bitcoin-now/237026> (last visited Mar. 20, 2023).

57. The Business Benefit of Using Cryptocurrency, Deloitte United States,  
<https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html> (last visited Mar. 21, 2023).
58. Jake Frankenfield, What Is Ethereum and How Does It Work?, Investopedia (Feb. 24, 2016),  
<https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 21, 2023).
59. Karin Kelley, What is Ethereum? Explained With Features and Applications, Simplilearn (May 12, 2020),  
<https://www.simplilearn.com/tutorials/blockchain-tutorial/what-is-ethereum> (last visited Mar. 20, 2023).
60. Jake Frankenfield, What Is Ethereum and How Does It Work?, Investopedia (Feb. 24, 2016),  
<https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 27, 2023).
61. Stephen Graves & Robert Stevens, What Is 'The Merge'? Ethereum's Move to Proof of Stake, Decrypt (Sept. 15, 2022),  
<https://decrypt.co/resources/what-merge-ethereum-move-proof-stake/> (last visited Mar. 22, 2023).
62. Jake Frankenfield, What Is Ethereum and How Does It Work?, Investopedia (Feb. 24, 2016),  
<https://www.investopedia.com/terms/e/ethereum.asp> (last visited Mar. 22, 2023).
63. Jake Frankenfield, Decentralized Applications (dApps): Definition, Uses, Pros and Cons, Investopedia (Feb. 6, 2018),  
<https://www.investopedia.com/terms/d/decentralized-applications-dapps.asp> (last visited Mar. 15, 2023).
64. Ripple (Payment Protocol), Wikipedia,  
[https://en.wikipedia.org/wiki/Ripple\\_\(payment\\_protocol\)](https://en.wikipedia.org/wiki/Ripple_(payment_protocol)) (last visited Mar. 21, 2023).
65. CB Insights, How Blockchain Could Disrupt Banking, CB Insights Research (Oct. 18, 2022),  
<https://www.cbinsights.com/research/blockchain-disrupting-banking/> (last visited Mar. 22, 2023).
66. Kate Rooney, Ripple Wants a Piece of the Global Payment System While It Fights a Cryptocurrency 'Holy War', CNBC (Jan. 8, 2019),  
<https://www.cnbc.com/2019/01/07/ripple-wants-a-piece-of-the-global-payment-system.html> (last visited Mar. 23, 2023).

67. What Is So Special About Polkadot?, OriginStamp, <https://originstamp.com/blog/what-is-so-special-about-polkadot/> (last visited Mar. 25, 2023).
68. Polkadot Parachains: A Deep Dive into Their Benefits and Functionality, New Tech (Feb. 24, 2023), <https://newtech.finance.blog/2023/02/24/benefits-of-polkadot-parachains/> (last visited Mar. 21, 2023).
69. The Role of Polkadot in the Interoperability of Blockchain Networks, TechStory (Mar. 21, 2023), <https://techstory.in/the-role-of-polkadot-in-the-interoperability-of-blockchain-networks/> (last visited Mar. 21, 2023).
70. Wendy Henry & Linda Pawczuk, Blockchain: Ready for Business, Deloitte Insights (Dec. 7, 2021), <https://www2.deloitte.com/us/en/insights/focus/tech-trends/2022/blockchain-trends.html> (last visited Mar. 23, 2023).
71. About, Binance, <https://www.binance.com/en/about> (last visited Mar. 27, 2023).
72. Binance Coin (BNB), Corporate Finance Institute (Dec. 6, 2022), <https://corporatefinanceinstitute.com/resources/cryptocurrency/binance-coin-bnb/> (last visited Mar. 22, 2023).
73. The Evolution of BNB: From Fees to Global DeFi Infrastructure, Binance Blog, <https://www.binance.com/en/blog/ecosystem/the-evolution-of-bnb-from-fees-to-global-defi-infrastructure-421499824684901925> (last visited Mar. 22, 2023).
74. Binance Coin (BNB) Price Prediction 2025-2030: Can BNB Reach \$3k by 2025?, AMBCRYPTO, <https://ambcrypto.com/binance-coin-bnb-price-prediction-26/> (last visited Mar. 21, 2023).
75. Privacy on Cryptocurrencies: What You Need to Know, Crypto.com, <https://crypto.com/university/privacy-cryptocurrencies> (last visited Mar. 21, 2023).
76. Ring Signature, Wikipedia, [https://en.wikipedia.org/wiki/Ring\\_signature](https://en.wikipedia.org/wiki/Ring_signature) (last visited Mar. 23, 2023).
77. Tom Wilson, Explainer: 'Privacy Coin' Monero Offers Near Total Anonymity, Reuters (May 15, 2019), <https://www.reuters.com/article/us-crypto-currencies-altcoins-explainer-idUSKCN1SLOF0> (last visited Mar. 22, 2023).

78. View: ICO Page, CryptoCoin.News, <https://cryptocoin.news/view-ico-page/> (last visited Mar. 27, 2023).
79. Home | Ergo Platform, Ergo Platform, <https://ergoplatform.org/> (last visited Mar. 23, 2023).
80. Is RenQ Finance (RENQ) the Next Cardano (ADA)? Experts Analyze, Mint (Mar. 27, 2023), <https://www.livemint.com/brand-stories/is-renq-finance-renq-the-next-cardano-ada-experts-analyze-11679915990644.html> (last visited Mar. 27, 2023).
81. Understanding Dash Governance, Dash Documentation, <https://docs.dash.org/en/stable/docs/user/governance/understanding.html> (last visited Mar. 27, 2023).
82. Cryptocurrency and the Myth of the Trustless Transaction, SSRN, [https://papers.ssrn.com/sol3/Delivery.cfm/SSRN\\_ID3617979\\_code89185.pdf?abstractid=3141605](https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3617979_code89185.pdf?abstractid=3141605) (last visited Mar. 27, 2023).
83. Rakesh Sharma, What Is Decred (DCR)?, Investopedia (May 1, 2018), <https://www.investopedia.com/news/decred-cryptocurrency-combines-pow-pos/> (last visited Mar. 24, 2023).
84. What is Decred (DCR)? The Hybrid Consensus Blockchain, Easy Crypto, <https://hub.easycrypto.com/decred-dcr> (last visited Mar. 24, 2023).
85. SingularityNET, <https://singularitynet.io/> (last visited Mar. 15, 2023).
86. Cardano Surpasses 100 EMA: ADA Bullishness is Inevitable, CryptoNewz, <https://www.cryptonewsz.com/cardano-surpasses-100-ema-ada-bullishness-is-inevitable/> (last visited Mar. 15, 2023).
87. SingularityNET Price, Coinbase, <https://www.coinbase.com/price/singularitynet> (last visited Mar. 13, 2023).
88. Fetch.ai Overview, CryptoLinks, <https://cryptolinks.com/1503/fetch> (last visited Mar. 15, 2023).
89. How to Launch Your Token: Choose the Right Blockchain Platform, Kairon Labs (Mar. 13, 2023), <https://blog.kaironlabs.com/how-to-launch-your-token-choose-the-right-blockchain-platform/> (last visited Mar. 13, 2023).
90. Top 10 Best Web3 Crypto Coins Set to Explode by 2025, Glomica, <https://www.glomica.com/top-10-best-web3-crypto-coins-set-to-explode-by-2025-market-volatility-230217104318> (last visited Mar. 13, 2023).

91. Numeraire, Investopedia,  
<https://www.investopedia.com/terms/n/numeraire.asp#:~:text=Key%20Takeaways-,Numeraire%20is%20an%20economic%20term%20of%20French%20origin%2C%20which%20acts,numeraire%20for%20most%20commodity%20prices> (last visited Mar. 15, 2023).
92. Nancy Lubale, Numeraire Price Prediction: NMR Rallies Over 100% To \$20 – Time To Buy?, Inside Bitcoins (Mar. 15, 2023),  
<https://insidebitcoins.com/news/numeraire-price-prediction-nmr-rallies-over-100-to-20-time-to-buy>.
93. Mirror.xyz,  
[https://mirror.xyz/0x10364bc63464bD9Cd6492e9a1C6DE7BF91e60D38/B-4zn9gFnEA5clu\\_sxrLe2Pz2U\\_nI4V-LEIcwWw9XKA](https://mirror.xyz/0x10364bc63464bD9Cd6492e9a1C6DE7BF91e60D38/B-4zn9gFnEA5clu_sxrLe2Pz2U_nI4V-LEIcwWw9XKA) (last visited Mar. 13, 2023).
94. What Is the Coin of Metaverse, Alibaba Cloud,  
<https://www.alibabacloud.com/topic-center/metaverse/1nc3co412j-what-is-the-coin-of-metaverse> (last visited Mar. 15, 2023).
95. Identos Achieves International Standard Software, Yahoo Finance,  
<https://finance.yahoo.com/news/identos-achieves-international-standard-software-144000769.html?guccounter=1> (last visited Mar. 14, 2023).
96. Guneet Kaur, How and Why Do Stablecoins Depeg?, Cointelegraph (Mar. 14, 2023), <https://cointelegraph.com/news/how-and-why-do-stablecoins-depeg>.
97. USDT Tether: A Stablecoin for the Cryptocurrency World, Secureshift.io, <https://secureshift.io/blog/usdt-tether-a-stablecoin-for-the-cryptocurrency-world> (last visited Mar. 15, 2023).
98. Tether: The Stablecoin with a Controversial Relationship with the Cryptocurrency Market, Internet Vibies,  
<https://www.internetvibes.net/2023/02/20/tether-the-stablecoin-with-a-controversial-relationship-with-the-cryptocurrency-market/> (last visited Mar. 15, 2023).
99. Gareth Jenkinson, Changes to Tether's Terms of Reserves Raises Fresh Concerns, Cointelegraph (Mar. 15, 2023),  
<https://cointelegraph.com/news/changes-to-tethers-terms-of-reserves-raises-fresh-concerns>.
100. Tether: Are There Enough US Dollars to Back All of the USDT Tokens in Circulation?, Block Foundations Crypto Education,  
<https://www.cryptoside.org/tether-are-there-enough-us-dollars-to->

back-all-of-the-usdt-tokens-in-circulation/ (last visited Mar. 15, 2023).

101. Tether: The \$1 Billion Mystery Near the Heart of the Biggest Bitcoin Exchange, Financial Review, <https://www.afr.com/markets/currencies/tether-the-1-billion-mystery-near-the-heart-of-the-biggest-bitcoin-exchange-20171206-gzzhmm> (last visited Mar. 15, 2023).
102. Tether (USDT), Investopedia, <https://www.investopedia.com/terms/t/tether-usdt.asp> (last visited Mar. 15, 2023).
103. Altcoin Guide, CompleteCryptocurrency, <https://www.completecryptocurrency.com/altcoin-guide/> (last visited Mar. 15, 2023).
104. Arjun Kharpal, Hackers Steal Over \$40 Million Worth of Bitcoin From One of the World's Largest Cryptocurrency Exchanges, CNBC (Mar. 15, 2023), <https://www.cnbc.com/2019/05/08/binance-bitcoin-hack-over-40-million-of-cryptocurrency-stolen.html>.
105. A History of Binance USD (BUSD), Watcher.Guru, <https://watcher.guru/news/a-history-of-binance-usd-busd> (last visited Mar. 15, 2023).
106. USDT vs BUSD, DataWallet, <https://www.datawallet.com/crypto/usdt-vs-busd> (last visited Mar. 15, 2023).
107. Binance USD Stablecoin to Be Delisted From Coinbase, Trading to Halt Starting March 13: All Details, Udaipur Kiran, <https://udaipurkiran.com/binance-usd-stablecoin-to-be-delisted-from-coinbase-trading-to-halt-starting-march-13-all-details> (last visited Mar. 13, 2022).
108. Jonathan Gan, The Circle USDC Depeg, Medium (Mar. 15, 2023), <https://jonngan.medium.com/the-circle-usdc-depeg-2d239175098f>.
109. Zac McClure, A Simple Guide to Stablecoin Taxes for 2023, TokenTax (Mar. 15, 2023), <https://tokentax.co/blog/how-are-stablecoins-taxed>.
110. Rose Tillerson, Understanding Tether's Role As A Stablecoin, The News God (Mar. 15, 2023), <https://thenewsgod.com/understanding-tethers-role-as-a-stablecoin/>.
111. MakerDAO, <https://makerdao.com/en/> (last visited Mar. 15, 2023).

112. Multi-Collateral DAI, Crypto.com, <https://crypto.com/price/multi-collateral-dai> (last visited Mar. 15, 2023).
113. Elizabeth Napolitano, MakerDAO Weighs Using Emergency Switch to Prevent Future DAI Depegging, CoinDesk (Mar. 15, 2023), <https://www.coindesk.com/business/2023/03/13/makerdao-weighs-using-emergency-switch-to-prevent-future-dai-depegging/>.
114. TrueUSD, <https://www.trueusd.com/> (last visited Mar. 15, 2023).
115. TrueUSD, Coinbase, <https://www.coinbase.com/price/trueusd#HistoryofTrueUSDTUSD> (last visited Mar. 15, 2023).
116. TrueUSD, Crypto.com, <https://crypto.com/price/trueusd> (last visited Mar. 15, 2023).
117. Cryptocurrency for Beginners: A Complete Guide, Geeks, <https://vocal.media/geeks/cryptocurrency-for-beginners-a-complete-guide> (last visited Mar. 15, 2023).
118. Financial Stability in Focus, Bank of England, <https://www.bankofengland.co.uk/financial-stability-in-focus/2022/march-2022> (last visited Mar. 15, 2023).
119. Bitcoin Price Future, Controltech Instalacje, <https://mrser.controltech-instalacje.pl/> (last visited Mar. 15, 2023).
120. Blockchain Laws and Regulations in Thailand, Global Legal Insights, <https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/thailand> (last visited Mar. 15, 2023).
121. Exploring the Practical Use of Cryptocurrency, LeoFinance, <https://leofinance.io/@young-kedar/exploring-the-practical-use-of-cryptocurrency> (last visited Mar. 15, 2023).
122. Best Metaverse Crypto: What Is Metaverse Crypto?, UpMortal, <https://upmortal.com/best-metaverse-crypto-what-is-metaverse-crypto/> (last visited Mar. 15, 2023).
123. Bored Ape Yacht Club, <https://boredapeyachtclub.com/#/> (last visited Mar. 15, 2023).
124. Bored Ape Yacht Club Collection, OpenSea, <https://opensea.io/collection/boredapeyachtclub> (last visited Mar. 15, 2023).
125. CryptoPunks Collection, OpenSea, <https://opensea.io/collection/cryptopunks> (last visited Mar. 15, 2023).

126. Roadmap for How to Create NFT Like CryptoPunks, DigiPrima, <https://www.digiprima.com/blogs/roadmap-for-how-to-create-nft-like-crypto-punks> (last visited Mar. 15, 2023).
127. What is a Smart Contract?, BitDegree, <https://www.bitdegree.org/crypto/tutorials/what-is-a-smart-contract> (last visited Mar. 15, 2023).
128. The Programming Guru, <https://theprogrammingguru.com/the-programming-guru/> (last visited Mar. 15, 2023).
129. The Role of NFTs in Virtual Real Estate, NFT Calendar, <https://www.nftdropscalendar.com/nft-blog/the-role-of-nfts-in-virtual-real-estate> (last visited Mar. 15, 2023).
130. Blockchain NFT Gaming Trends, MetaPunk, <https://www.metapunk.to/alan/blockchain-nft-gaming-trends-3ld> (last visited Mar. 15, 2023).
131. Seamless Blockchain Battle Royale Gameplay on Skale, Skale, <https://skale.space/blog/ibloxx-studios-0xbattleground-offers-seamless-blockchain-battle-royale-gameplay-on-skale> (last visited Mar. 15, 2023).
132. Building a Community of Players and Developers, Isotopic, <https://isotopic.io/building-community-of-players-and-developers/> (last visited Mar. 15, 2023).
133. Top 5 Best Metaverse Crypto Coins to Buy in 2023, Switchere, <https://blog.switchere.com/top-5-best-metaverse-crypto-coins-to-buy-in-2023/> (last visited Mar. 15, 2023).
134. How to Create a Cryptocurrency, CryptoGlue, <https://www.cryptoglue.com/2023/01/26/how-to-create-a-cryptocurrency/> (last visited Mar. 15, 2023).
135. GSPARTNERS Bitcoin, CoachKristal, <https://coachkristal.com/gspartners-bitcoin/> (last visited Mar. 15, 2023).
136. Decentraland, <https://decentraland.org/> (last visited Mar. 15, 2023).
137. Crypto Predictions for Crypto Market Investors, Bitcoinist, <https://bitcoinist.com/cryptopredictions-for-crypto-marketinvestors/> (Apr. 4, 2023, 6:29 PM).
138. Blockchain Law Firm – Oberheiden, P.C. – Federal Lawyer, <https://federallawyer.com/blockchain/> (Apr. 4, 2023, 6:29 PM).

139. Financial Crimes Enforcement Network, [https://www.ncen.gov/sites/default/files/shared/sar\\_guidance\\_casino.pdf](https://www.ncen.gov/sites/default/files/shared/sar_guidance_casino.pdf) (Apr. 4, 2023, 6:29 PM).
140. Uncovering the Truth: Bitcoin Capital Review – Legit or Scam?, <https://www.keinwettruesten.de/uncovering-thetruth-bitcoin-capital-reviewlegit-or-scam/> (Apr. 4, 2023, 6:29 PM).
141. Peter Schiff Blames Too Much Government Regulation for Worsening, Cryptopolitan, <https://www.cryptopolitan.com/peter-schiff-blames-governmentregulation/> (Apr. 4, 2023, 6:29 PM).
142. Который Рассматривает Запуск – Translation into English – Examples, <https://context.reverso.net/translation/russianenglish/> (Apr. 4, 2023, 6:29 PM).
143. Is The Biden Administration Politicizing Crypto?, Crypto News, <https://cryptonews.net/news/legal/20745892/> (Apr. 4, 2023, 6:29 PM).
144. Wencui Han & Eric C. Larson, Teaching Case: The Initial Coin Offering Marketplace: A Data Analytic Case, *Journal of Information Systems Education*, Vol. 33, Iss. 2, 135–140 (2022), available at <https://aisel.aisnet.org/jise/vol33/iss2/4>.
145. SC Quashes RBI Ban on Banking Services to Cryptocurrency Dealers [Read Judgment], Live Law, <https://www.livelaw.in/top-stories/breaking-sc-quashes-reserve-bank-of-indias-ban-on-cryptocurrency-153427> (last updated 2020, accessed Apr. 5, 2023).
146. Pancreatic Cancer Treatment in India: The Journey of Courage, Reddit, [https://www.reddit.com/user/treatcare/comments/126cini/pancreatic\\_cancer\\_treatment\\_in\\_india\\_the\\_journey/](https://www.reddit.com/user/treatcare/comments/126cini/pancreatic_cancer_treatment_in_india_the_journey/) (Apr. 4, 2023, 6:29 PM).
147. Income Tax Act, 1961: A Comprehensive Overview, iPleaders, <https://blog.ipleaders.in/incometax-act-1961-a-comprehensiveoverview/> (Apr. 4, 2023, 6:29 PM).
148. N. Hildreth, Cryptocurrency Bill 2021: The Road Ahead – Fintech – India, Lumiere Law Partners, <https://www.mondaq.com/india/fintech/1145012/cryptocurrency-bill-2021-the-road-ahead> (accessed Apr. 5, 2023).
149. Fintech Primer – II, Argus P., <https://www.argus-p.com/paperspublications/thoughtpaper/ntech-primer-ii/> (Apr. 4, 2023, 6:29 PM).

150. CAB Order, Ministry of Finance, F.No. CG-DL-E-07032023-244184 (Mar. 7, 2023).
151. Weekly Round-Up #44 | Cryptocurrencies and DeDollarization: Navigating, LinkedIn, <https://www.linkedin.com/pulse/weekly-round-up-44-cryptocurrencies-dedollarization-navigating> (Apr. 4, 2023, 6:29 PM).
152. Cryptocurrency and Blockchain Technology, Crypto CIRQLE, <https://cryptocirql.com/cryptocurrency-and-blockchain-technology> (last visited Mar. 15, 2023).
153. What is Blockchain Technology and How Does It Work?, Collabnix, <https://collabnix.com/what-is-blockchain-technology-and-how-does-it-work/> (last visited Mar. 15, 2023).
154. What is Blockchain Technology?, Intercom Help, <https://intercom.help/sharing-ltd/en/articles/5015127-what-is-blockchain-technology> (last visited Mar. 15, 2023).
155. Shiv Gupta, Could Blockchain Improve Cybersecurity Of Supply Chains?, Top Web Development Companies, (Mar. 15, 2023), <https://topwebdevelopmentcompanies.com/blockchain/could-blockchain-improve-cybersecurity-of-supply-chains>.
156. The Power of Blockchain, CERT-TRACE, <https://cert-trace.com/the-power-of-blockchain/> (last visited Mar. 15, 2023).
157. Christy J. Varghese, What is Blockchain Technology? – The Detailed Guide, Sunstone, (Mar. 15, 2023), <https://sunstone.in/blog/blockchain-technology>.
158. Smart Energy Drive: Revamping Oil and Gas Industry with Blockchain Technology, BIS Research, <https://bisresearch.com/news/smart-energy-drive-revamping-oil-and-gas-industry-with-blockchain-technology> (last visited Mar. 15, 2023).
159. Security & Blockchain Network, LinkedIn, [https://www.linkedin.com/posts/eya-elkamel-31a87b199\\_security-blockchain-network-activity-6967835281810989056-IyNx/?originalSubdomain=tn](https://www.linkedin.com/posts/eya-elkamel-31a87b199_security-blockchain-network-activity-6967835281810989056-IyNx/?originalSubdomain=tn) (last visited Mar. 15, 2023).
160. Crypto Dictionary, Scalac, <https://scalac.io/crypto-dictionary/> (last visited Mar. 15, 2023).
161. Understanding Blockchain Technology, Crypto Digs, <https://www.cryptodigs.in/2023/03/understanding-blockchain-technology-in.html> (last visited Mar. 14, 2023).

162. Ethereum's Shift from Proof of Work (PoW) to Proof of Stake (PoS) Consensus Algorithm, Programming Insider, <https://programminginsider.com/ethereums-shift-from-proof-of-work-pow-to-proof-of-stake-pos-consensus-algorithm/> (last visited Mar. 14, 2023).
163. Blockchain in Banking, UK Diss, <https://ukdiss.com/examples/blockchain-in-banking.php> (last visited Mar. 14, 2023).
164. FAQ, ReNFT, <https://www.renft.io/faq> (last visited Mar. 14, 2023).
165. The Environmental Impact of NFTs: Examining the Carbon Footprint of Digital Art, Houltech, <https://www.houltech.com/post/the-environmental-impact-of-nfts-examining-the-carbon-footprint-of-digital-art> (last visited Mar. 14, 2023).
166. Saima Asim, The Role of Blockchain Technology in NFTs, Aswad.Tech, (Mar. 14, 2023), <https://aswad.tech/the-role-of-blockchain-technology-in-nfts/>.
167. Use Cases for NFTs in 2023: Where Are We Heading To, Brightscout, <https://www.brightscout.com/insight/use-cases-for-nfts-in-2023-where-are-we-heading-to> (last visited Mar. 14, 2023).
168. NFT for Dummies, Coindoo, <https://coindoo.com/nft-for-dummies/> (last visited Mar. 14, 2023).
169. 5 Reasons Why NFTs Are the Future, Global Finance Fantaser Blogs, <https://www.fantaserblogs.com/5-reasons-why-nfts-are-the-future> (last visited Mar. 14, 2023).
170. What is NFT?, Forex24hr.com, <https://www.forex24hr.com/wstories/what-is-nft/> (last visited Mar. 14, 2023).
171. The Basics of NFTs: Understanding Non-Fungible Tokens, Info World, <https://www.infoworld555.com/2023/02/the-basics-of-nfts-understanding-non.html> (last visited Mar. 14, 2023).
172. The Role of Blockchain Technology in NFTs, Mirror.xyz, <https://mirror.xyz/0xd22bd1d396C130A9BdB11D9cD278b93903B3F234/hWdvnVRwyGhtbIqWJOqPIIMpicPq37xal-aFB72ZMRU> (last visited Mar. 14, 2023).
173. Why Do We Need to Prepare for NFTs, DigiBaap, <https://digibaap.com/why-do-we-need-to-prepare-for-nfts> (last visited Mar. 14, 2023).

174. Rajanikant Swami, Web 3.0: What and Future of Web, Medium, (Mar. 14, 2023), <https://medium.com/@nicerajanikant/web-3-0-what-and-future-of-web-71b6549b4de8>.
175. Crypto Community Articles, Coin Market Cap, <https://coinmarketcap.com/community/articles/63ffed8b6df569597cd748a5> (last visited Mar. 14, 2023).
176. Ernest Akakpo, DAOs (Decentralized Autonomous Organizations), LinkedIn, (Mar. 14, 2023), <https://www.linkedin.com/pulse/daos-decentralized-autonomous-organizations-ernest-akakpo/>.
177. Shraddha Khattri, DAOs: A New Way of Doing Business in the Digital Age, Blockchain Lawyer, <https://www.blockchainlawyer.in/post/daos-a-new-way-of-doing-business-in-the-digital-age>.
178. Mia Tolusic, Are Tokenised Assets Crypto?, LinkedIn, (Mar. 14, 2023), [https://www.linkedin.com/posts/mia-tolusic\\_tokenized-blockchain-decentralized-activity-7028766098623746048-TBf-/?originalSubdomain=pr](https://www.linkedin.com/posts/mia-tolusic_tokenized-blockchain-decentralized-activity-7028766098623746048-TBf-/?originalSubdomain=pr).
179. Crypto Token vs. Coin, Phemex, <https://phemex.com/blogs/crypto-token-vs-coin> (last visited Mar. 14, 2023).
180. Cryptocurrency: Security or Utility?, 0Percent, <https://0percent.com/cryptocurrency-security-or-utility/> (last visited Mar. 14, 2023).
181. Fantasy Game, Web 3O'Clock, <https://web3oclock.com/fantasy-game> (last visited Mar. 14, 2023).
182. Rakesh, Top 10 Bitcoin Alternatives With Growth Potential in 2023, Rakesh Offers, (Mar. 14, 2023), <https://rakeshoffers.com/>.
183. Ultimate Guide to Asset Tokenization: Exploring the Technical Aspects and Benefits, Forem, <https://forem.dev/bookerrjanece/ultimate-guide-to-asset-tokenization-exploring-the-technical-aspects-and-benefits-13nl> (last visited Mar. 14, 2023).
184. How to Use 1inch on Polygon (Formerly Matic Network), 1inch, <https://help.1inch.io/en/articles/5230030-how-to-use-1inch-on-polygon-formerly-matic-network> (last visited Mar. 14, 2023).
185. How to Own a Fraction of a Property for Free, Muphy Mustapha, <https://www.muphymustapha.com/how-to-own-a-fraction-of-a-property-for-free> (last visited Mar. 14, 2023).

- 186.5 Key Private Equity Risks and How to Manage Them, IFSA Private Equity, <https://ifsaprivateequity.com/2023/01/12/5-key-private-equity-risks-and-how-to-manage-them/> (last visited Mar. 14, 2023).
187. CeFi vs. DeFi: Which is Better?, Medium, <https://medium.com/@KuWallet/cefi-vs-defi-which-is-better-kucoin-wallet-web3-academy-e4d054318ccf> (last visited Mar. 14, 2023).
188. Investing in the Best DeFi Projects of 2023, UnleasHEST, <https://unleashest.com/investing-in-the-best-defi-projects-of-2023/> (last visited Mar. 14, 2023).
189. What is DeFi and How Does It Work?, Crypto Wave World, <https://cryptowaveworld.com/for-beginners/2093/what-is-defi-and-how-does-it-work/> (last visited Mar. 14, 2023).
190. What is DeFi and How DeFi Works, Encryptool, <https://www.encryptool.com/2023/02/what-is-defi-and-how-defi-works.html> (last visited Mar. 14, 2023).
191. Synthetic Assets on Blockchain, Vera Verdict, <https://www.veradiverdict.com/p/synthetic-assets-on-blockchain> (last visited Mar. 14, 2023).
192. Orion Protocol Prices, Uphold, <https://uphold.com/en-us/prices/crypto/orion-protocol> (last visited Mar. 14, 2023, 05:30 AM).
193. Cortex, Cortex Labs, <https://cortexlabs.ai/> (last visited Mar. 14, 2023).
194. Khor Win Win, Chiliz - Bringing Power Back to the Fans, CoinGecko, 1-10 (2021), <https://assets.coingecko.com/reports/Research/Chiliz-Bringing-Power-Back-To-The-Fans.pdf>.
195. Akash Kotalwar, Decentralized Finance (DeFi): The Future of Financial Services, Blogspot, (Mar. 14, 2023, 05:11 AM), <https://akashkotalwar.blogspot.com/2023/03/decentralized-finance-defi-future-of.html>.
196. How Experts Predicted That..., Islam for Trading, <http://www.islamfortrading.com/2023/03/how-experts-predicted-that.html> (last visited Mar. 15, 2023).
197. Ethereum Proof of Work and Proof of Stake Explained, Trading Sim, <https://www.tradingsim.com/day-trading/ethereum-proof-of-work-and-proof-of-stake-explained> (Mar. 15, 2023).

198. Rahul AR, The Scope of Decentralizing Data Marketplaces Using Blockchain, Accubits Blog (Mar. 15, 2023), <https://blog.accubits.com/the-scope-of-decentralizing-data-marketplaces-using-blockchain/>.
199. Dr. Vivek Pandey, Promising Future of Blockchain Technology in Medtech Industry, LinkedIn (Mar. 15, 2023), <https://www.linkedin.com/pulse/promising-future-blockchain-technology-medtech-industry-pandey/>.
200. Feed The Whale, Feed The Whale, <https://feedthewhale.com/> (last visited Mar. 15, 2023).
201. Mayowa Olatunji, Why Do You Need A Decentralized Exchange In 2023?, Medium (Mar. 15, 2023), <https://medium.com/@olatumjimayowa0396/why-do-you-need-a-decentralized-exchange-in-2023-f3add8c80cbb>.
202. Crypto Token Development: A Comprehensive Guide for Startups in 2023, Antier, <https://www.antiersolutions.com/crypto-token-development-a-comprehensive-guide-for-startups-in-2023/> (last visited Mar. 15, 2023).
203. What Are Decentralized Exchange Platforms?, One37PM, <https://www.one37pm.com/nft/what-are-decentralized-exchange-platforms> (last visited Mar. 15, 2023).
204. Important Crypto Definitions and Glossary Explained for Beginners, BBN Times, <https://www.bbntimes.com/financial/16-important-crypto-definitions-and-glossary-explained-for-beginners> (last visited Mar. 15, 2023).
205. Short Series: What Are Hot Wallets?, Crypto Adventure, <https://cryptoadventure.com/community/articles/short-series-what-are-hot-wallets/> (last visited Mar. 15, 2023).
206. Secure Web3 Crypto Wallet, Dappfoundery, <https://www.dappfoundery.com/blogs/secure-web3-crypto-wallet> (last visited Mar. 15, 2023).
207. Bitcoin Wallet, Bitcoin Wallet, <https://bitcoinwallet-2.gitbook.io/us> (last visited Mar. 15, 2023).
208. Cryptocurrency Glossary, Phemex, <https://phemex.com/academy/cryptocurrency-glossary> (last visited Mar. 15, 2023).

209. Best Cold Storage Wallets, STP News, <https://news.safaritravelplus.com/cryptocurrency/best-cold-storage-wallets/> (last visited Mar. 15, 2023).
210. What is Cryptocurrency?, Kaspersky, <https://www.kaspersky.com/resource-center/definitions/what-is-cryptocurrency> (last visited Mar. 15, 2023).
211. Different Ways to Store Your Crypto Explained, LeoFinance, <https://leofinance.io/@californiacrypto/different-ways-to-store-your-crypto-explained> (last visited Mar. 15, 2023).
212. Types of Bitcoin Wallets, Breet, <https://blog.breet.app/types-of-bitcoin-wallets> (last visited Mar. 13, 2023).
213. Bitcoin Wallets, River Financial, <https://river.com/learn/bitcoin-wallets> (last visited Mar. 13, 2023).
214. RBI Brings Non-Bank Sector Into Alignment, XBRL, <https://www.xbrl.org/news/rbi-brings-non-bank-sector-into-alignment/> (last visited Mar. 15, 2023).
215. How to Customize Your Fixed Deposit to Earn 9% P.A. in Passive Income, OdishaTV.in, <https://odishatv.in/news/technology/how-to-customize-your-fixed-deposit-to-earn-9-p-a-in-passive-income-198653> (last visited Mar. 15, 2023).
216. Question 24, eLearnMarkets, <https://www.elearnmarkets.com/school/units/100-faq-s-on-basic-finance/question-24> (last visited Mar. 15, 2023).
217. The Entertainment Industry in Vietnam Has Undergone Significant Changes in Recent Years With the, Studocu, <https://www.studocu.com/en-us/messages/question/2851094/the-entertainment-industry-in-vietnam-has-undergone-significant-changes-in-recent-years-with-the> (last visited Mar. 15, 2023).
218. What Resilience Means to My Generation, UCL, <https://blogs.ucl.ac.uk/resilience/2013/08/21/what-resilience-means-to-my-generation/> (last visited Mar. 15, 2023).
219. Report on Payment Transactions in India, DataChamps, <https://datachamps.ai/blog/report-on-payment-transactions-in-india/> (last visited Mar. 15, 2023).
220. Safe and Secure WhatsApp Payments, Clickatell, <https://www.clickatell.com/blog/safe-and-secure-whatsapp-payments/> (last visited Mar. 15, 2023).

221. Vishal Sharma A, Jaivignesh G, Suriyaa S, Raghul P, Anjali Jha M, Santhiya D, A Study on the Level of Awareness of Digital Payments in India Among the Gen Z Population, IJIRMF 9 (2023).
222. Turner Wright, ECB Official Suggests Importance of Physical Stores Accepting Digital Euro, CoinTelegraph (Mar. 15, 2023), <https://cointelegraph.com/news/ecb-official-suggests-importance-of-physical-stores-accepting-digital-euro>.
223. Sarang Pokhare, The Rise of CBDCs: How Digital Currencies Could Revolutionize Finance, LinkedIn (Mar. 15, 2023), <https://www.linkedin.com/pulse/rise-cbdcs-how-digital-currencies-could-revolutionize-sarang/>.
224. Bitcoin Community Casts Wary Eye on Government Regulation and Central Banks, SiliconANGLE (Oct. 14, 2022), <https://siliconangle.com/2022/10/14/bitcoin-community-casts-wary-eye-government-regulation-central-banks/> (last visited Mar. 15, 2023).
225. RBI Working on Phased Implementation of Digital Currency: Minister, India Blooms, <https://www.indiablooms.com/finance-details/15640/rbi-working-on-phased-implementation-of-digital-currency-minister.html> (last visited Mar. 15, 2023).
226. Ethereum Classic Popular Use Cases For Entertainment, CryptoWeekly, [https://cryptoweekly.co/crypto-blog/Ethereum%20Classic%20Popular%20Use%20Cases%20For%20Entertainment\\_263?page=19](https://cryptoweekly.co/crypto-blog/Ethereum%20Classic%20Popular%20Use%20Cases%20For%20Entertainment_263?page=19) (last visited Mar. 15, 2023).
227. New Ukrainian Law to Treat CBDC as Cash, Investing.com, <https://www.investing.com/news/cryptocurrency-news/new-ukrainian-law-to-treat-cbdc-as-cash-2549067> (last visited Mar. 15, 2023).
228. Vremarioiu Alin, What Are The Advantages of Cryptocurrency?, Medium (Mar. 15, 2023), <https://medium.com/coinmonks/what-are-the-advantages-of-cryptocurrency-886819a3ce58>.
229. Ultimate Guide to Cryptocurrency, Tech Error Report, <https://techerreport.com/ultimate-guide-to-cryptocurrency> (last visited Mar. 15, 2023).
230. The Future of Money: Top 10, CoinTokenBit, <https://www.infotoken.site/2023/03/the-future-of-money-top-10.html> (last visited Mar. 15, 2023).

231. Blockchain Technology Overview and Opportunities, Global Insights Partner, <https://www.globalinsightspartner.com/blog/blockchain-technology-overview-and-opportunities> (last visited Mar. 15, 2023).
232. Top Crypto Tokens to Invest, Metaverse Post, <https://mpost.io/top-crypto-tokens-to-invest/> (last visited Mar. 15, 2023).
233. Explore the Key Advantages and Disadvantages of Investing in Cryptocurrency, Trade Revenue Pro, <https://traderevenuepro.com/explore-the-key-advantages-and-disadvantages-of-investing-in-cryptocurrency/trade-article/> (last visited Mar. 15, 2023).
234. Crypto vs. Traditional Finance, DB Investing, <https://dbinvesting.com/blog/crypto-vs-traditional-finance/> (last visited Mar. 15, 2023).
235. Chloe Orji, Bitcoin Ban: These Are the Countries Where Crypto Is Restricted or Illegal, Euronews Next (Aug. 25, 2022), <https://www.euronews.com/next/2022/08/25/bitcoin-ban-these-are-the-countries-where-crypto-is-restricted-or-illegal2>.
236. 85% of Big Retailers Accept Cryptocurrency as a Form of Payment, PYMNTS (Jun. 24, 2022), <https://www.pymnts.com/metaverse/2023/how-facebook-turned-the-metaverse-into-a-buzzword/>.
237. What Really Moves the Forex Market?, Forex Academy (Mar. 8, 2023), <https://www.forex.academy/what-really-moves-the-forex-market/>.
238. Dan Ashmore & Farran Powell, What Are Meme Coins? Are They Worth Investing In?, Forbes (July 4, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-are-meme-coins-are-they-worth-investing-in/>.
239. Tatiana Koffman, The Rise Of Decentralized Exchanges On Polkadot, Forbes (Apr. 27, 2021), <https://www.forbes.com/sites/tatianakoffman/2021/04/27/the-rise-of-decentralized-exchanges-on-polkadot/?sh=4de4682e8169>.
240. Robert Farrington, Play-To-Earn Gaming Is Driving NFT And Crypto Growth, Forbes (Dec. 13, 2021), <https://www.forbes.com/sites/robertfarrington/2021/12/13/play-to-earn-gaming-is-driving-nft-and-crypto-growth/?sh=43c5da34c2dc>.
241. Tobi Opeyemi Amure, How to Deal With Crypto FOMO, Investopedia (last updated Feb. 28, 2023), <https://www.investopedia.com/deal-with-crypto-fomo-6455103>.

242. Oscar Williams-Grut, People Are Raising Hundreds of Millions Selling Digital Coins Online — It's Either the Future of Funding or a 'Bubble', Insider (July 8, 2017, 1:05 PM), <https://www.insider.com/initial-coin-offerings-explained-icos-token-crowdsale-2017-7>.
243. Stephen Graves et al., The 15 Most Expensive NFTs Ever Sold, Decrypt (Feb. 21, 2022), <https://decrypt.co/62898/most-expensive-nfts-ever-sold>.
244. Arjun Kharpal, As Much As \$365 Billion Wiped Off Cryptocurrency Market After Tesla Stops Car Purchases With Bitcoin, NBC News (May 13, 2021, 6:46 PM), <https://www.nbcnews.com/tech/tech-news/365-billion-wiped-cryptocurrency-market-musks-tweet-rcna922>.
245. Ante, L., How Elon Musk's Twitter Activity Moves Cryptocurrency Markets, Technological Forecasting and Social Change, vol. 186, p. 122112 (2023), available at <https://doi.org/10.1016/j.techfore.2022.122112>.
246. Ahiza Garcia, DJ Khaled, Floyd Mayweather Jr. Charged With Promoting Cryptocurrency Without Disclosing They Were Paid, CNN Business (Nov. 30, 2018), <https://edition.cnn.com/2018/11/29/tech/dj-khaled-floyd-mayweather-coin-crypto-sec/index.html>.
247. Joseph Young, SEC May Start Going After Crypto ICO Promoters Who Failed to Disclose Compensation, U.Today (Dec. 1, 2023, 2:29 PM), <https://u.today/sec-may-start-going-after-crypto-ico-promoters-who-failed-to-disclose-compensation>.
248. Dogecoin, What Is Dogecoin?, Dogecoin, <https://dogecoin.com/dogepedia/articles/what-is-dogecoin/> (last visited Mar. 27, 2023).
249. Grace Kay, The History of Dogecoin, the Cryptocurrency That Surged After Elon Musk Tweeted About It But Started as a Joke on Reddit Years Ago, Business Insider India (Feb. 9, 2021, 9:51 PM), <https://www.businessinsider.in/stock-market/news/the-history-of-dogecoin-a-cryptocurrency-that-started-as-a-joke-on-reddit-years-ago-and-recently-surged-600-in-a-wall-street-bets-copycat-rally/articleshow/80592974.cms>.
250. Jasper Jolly, Price of Dogecoin Rises by 50% Following Elon Musk Tweet, The Guardian (Feb. 4, 2021, 11:33 AM),

<https://www.theguardian.com/business/2021/feb/04/price-of-dogecoin-rises-by-50-following-elon-musk-tweet>.

251. Rani Molla, When Elon Musk Tweets, Crypto Prices Move, Vox (Jun. 14, 2021, 11:00 AM), <https://www.vox.com/recode/2021/5/18/22441831/elon-musk-bitcoin-dogecoin-crypto-prices-tesla>.
252. Sean Michaels, Kanye West Inspired Bitcoin Alternative to Launch Next Month, The Guardian (Jan. 3, 2014, 11:06 AM), <https://www.theguardian.com/music/2014/jan/03/kanye-coinye-west-bitcoin-coinye-cryptocurrency>.
253. Felix Mollen, Snoop Dogg Joins Crypto Casino as Chief Ganjaroo Officer, Cryptopotato (Mar. 6, 2023), <https://cryptopotato.com/snoop-dogg-crypto-casino-roobet-chief-ganjaroo-officer/>.
254. Taylor Locke, Mark Cuban Says Dogecoin Is the ‘Strongest’ Cryptocurrency as a Medium of Exchange, CNBC (Aug. 13, 2021, 3:48 PM), <https://www.cnbc.com/2021/08/13/mark-cuban-dogecoin-is-the-strongest-crypto-as-a-medium-of-exchange.html>.
255. Taylor Soper, Ethereum Co-Founder and Mark Cuban Put \$25M Toward Unikrn Esports Betting Platform’s Digital Token Sale, CNBC (Sept. 25, 2017, 9:27 PM), <https://www.cnbc.com/2017/09/25/ethereum-co-founder-and-mark-cuban-put-25m-toward-unikrn-esports-betting-platforms-digital-token-sale.html>.
256. Coinbase, Basic Attention Token, Coinbase, <https://basicattentiontoken.org/> (last visited Mar. 27, 2023).
257. Alex Moskov, What Is Polygon (MATIC)? A Guide on the Ethereum Layer Two Solution, CoinCentral (Nov. 5, 2022), <https://coincentral.com/what-is-polygon-matic-a-guide-on-the-ethereum-layer-two-solution/>.
258. PayPal, PayPal Launches New Service Enabling Users to Buy, Hold and Sell Cryptocurrency, PayPal Newsroom (Oct. 21, 2020), <https://newsroom.paypal-corp.com/2020-10-21-PayPal-Launches-New-Service-Enabling-Users-to-Buy-Hold-and-Sell-Cryptocurrency>.
259. VeChain, VeChain Partners With PwC to Boost Blockchain Technology Utility in Asia, VeChain Insider (May 22, 2017), <https://vechaininsider.com/partnerships/vechain-partners-with-pwc-to-boost-blockchain-technology-utility-in-asia/>.

260. Reuters Staff, Blockchain Firm Ripple to End Partnership With MoneyGram, Reuters (last updated Mar. 9, 2021, 4:05 AM), <https://www.reuters.com/article/us-ripple-moneygram-intl-idUSKBN2B02KO>.
261. John Warmann, Significance and Impact of a Brand Ambassador for Blockchain Companies, KeyCoinAssets (Feb. 5, 2019), <https://keycoinassets.com/the-significance-and-impact-of-a-brand-ambassador-for-blockchain-companies/>.
262. Edul Patel, Why Is DYOR Important While Investing in Crypto?, The Economic Times, <https://economictimes.indiatimes.com/markets/cryptocurrency/why-is-dyor-important-while-investing-in-crypto/articleshow/97942839.cms?from=mdr> (last updated Feb. 15, 2023, 1:36 PM).
263. Press Release, Department of Justice, BitConnect Founder Indicted in Global \$2.4 Billion Cryptocurrency Scheme (Feb. 25, 2022), <https://www.justice.gov/opa/pr/bitconnect-founder-indicted-global-24-billion-cryptocurrency-scheme>.
264. Press Release, Department of Justice, Co-Founder of Multi-Billion-Dollar Cryptocurrency Pyramid Scheme “OneCoin” Pleads Guilty (Dec. 16, 2022), <https://www.justice.gov/usao-sdny/pr/co-founder-multi-billion-dollar-cryptocurrency-pyramid-scheme-onecoin-pleads-guilty>.
265. Marcos Cabello, New Year, New Savings Plan: 5 Smart Tips for Beginning Investors, CNET (Jan. 2, 2023, 6:15 AM), <https://www.cnet.com/personal-finance/investing/new-year-new-savings-plan-5-smart-tips-for-beginning-investors/>.
266. Akhilesh Ganti, Panic Selling, Investopedia, <https://www.investopedia.com/terms/p/panicselling.asp> (last updated Sept. 21, 2022).
267. David Reid & Arjun Kharpal, Bitcoin Suffers Mystery Flash Crash on Popular Cryptocurrency Index, CNBC (Oct. 10, 2017, 5:58 AM), <https://www.cnbc.com/2017/10/10/bitcoin-price-falls-after-russia-proposes-ban-on-exchanges.html>.
268. NDTV, Planning to Invest in Cryptocurrencies? Here's How to Reduce Risk of Losing Money, NDTV Profit, <https://www.ndtv.com/business/investing-in-cryptocurrencies-here-s-how-to-reduce-the-risks-2495248> (last updated Aug. 8, 2021, 5:27 PM).

269. Bouri, E., Gupta, R. & Roubaud, D., Herding Behaviour in Cryptocurrencies, *Finance Research Letters*, 29, pp. 216–221 (2019), available at <https://doi.org/10.1016/j.frl.2018.07.008>.
270. Jonathan Garber, Bitcoin Plunges Back Below \$4,000, *Business Insider* (Nov. 30, 2018, 6:59 PM), <https://markets.businessinsider.com/currencies/news/bitcoin-price-plunges-back-below-4000-2018-11-1027770955>.
271. Jasper Jolly, Bitcoin Price Hits All-Time High of Almost \$20,000, *The Guardian* (Nov. 30, 2020, 7:44 PM), <https://www.theguardian.com/technology/2020/nov/30/bitcoin-price-hits-all-time-high-of-almost-20000>.
272. Ahn, Y. & Kim, D., Emotional Trading in the Cryptocurrency Market, *Finance Research Letters*, 42, p. 101912 (2021), available at <https://doi.org/10.1016/j.frl.2020.101912>.
273. Kevin L. Matthews II, Regular Portfolio Rebalancing is Key to Keeping Your Investment Strategy on Track. Here's How to Do It, *Business Insider* (July 15, 2022), <https://www.businessinsider.com/personal-finance/rebalance-portfolio?IR=T>.
274. Edul Patel, Why is Diversification of a Crypto Portfolio So Important, *Financial Express*, <https://www.financialexpress.com/blockchain/why-is-diversification-of-a-crypto-portfolio-so-important/3014652/> (last updated Mar. 20, 2023, 9:56 AM).
275. Keith Noreika, Sudhir Jain & Joshua Kuntz, Crypto Requires Robust Risk Management Framework, *Patomak Global Partners* (Nov. 22, 2022), <https://patomak.com/2022/11/22/crypto-requires-robust-risk-management-framework/#:~:text=Concentration%20risk%20can%20take%20many,and%20certain%20types%20of%20collateral>.
276. Coryanne Hicks, 5 Crypto Scams to Watch Out For, *Forbes Advisor*, <https://www.forbes.com/advisor/investing/cryptocurrency/top-crypto-scams/> (last updated Jan. 3, 2023, 1:21 PM).
277. Gemini, Basic Trading Order Types, *Cryptopedia*, <https://www.gemini.com/cryptopedia/crypto-trading-strategies-trading-basics-limit-orders> (last updated Mar. 11, 2022).
278. Chad Shoop, Navigating the Most Exciting Time — Earnings Season!, *Banyan Hill Publishing* (Apr. 13, 2021),

<https://banyanhill.com/navigating-most-exciting-time-stock-market-earnings-season/>.

279. Colin Dodds, Portfolio Diversification: What Investors Need to Know, Britannica Money, <https://www.britannica.com/money/portfolio-diversification-benefits> (last updated Mar. 09, 2023).
280. Paulina Likos, 7 Ways to Diversify Your Crypto Portfolio and Limit Risk, U.S. News & World Report (Mar. 22, 2022), <https://money.usnews.com/investing/cryptocurrency/slideshows/ways-to-diversify-your-crypto-portfolio-and-limit-risk>.
281. Charles Bovaird, How Much of Your Portfolio Should Be in Crypto?, Forbes (May 7, 2019, 3:14 PM), <https://www.forbes.com/sites/cbovaird/2019/05/07/how-much-of-your-portfolio-should-be-in-crypto/?sh=6a7bab043611>.
282. Jacob Wade, The Fundamentals: How to Analyze Cryptocurrency, Investopedia, <https://www.investopedia.com/analyze-crypto-6456223> (last updated Feb. 28, 2023).
283. International Banker, Has Credibility in the Cryptocurrency Market Finally Arrived? (June 18, 2021), <https://internationalbanker.com/brokerage/has-credibility-in-the-cryptocurrency-market-finally-arrived/>.
284. Stephanie Ross, Communities and Their Importance in Crypto, Market Business News (Feb. 9, 2023, 9:17 PM), <https://marketbusinessnews.com/communities-and-their-importance-in-crypto/322611/>.
285. James Tennant, Why Partnerships Are Vital for the Success of Cryptocurrencies, Converge (June 24, 2018), <https://converge.today/article/why-partnerships-are-vital-for-the-success-of-cryptocurrencies>.
286. Ripple Expands into Europe with Two Partnerships, ThePaypers (Oct. 12, 2022), <https://thepappers.com/cryptocurrencies/ripple-expands-into-europe-with-two-partnerships--1258720>.
287. Coinbase, What Is Market Cap?, Coinbase, market-cap#:~:text=For%20a%20cryptocurrency%20like%20Bitcoin,price%20of%20a%20single%20coin (last visited Mar. 27, 2023).
288. Vishal Gaur & Abhinav Gaiha, Building a Transparent Supply Chain, Harvard Business Review (May 2020), <https://hbr.org/2020/05/building-a-transparent-supply-chain>.

289. Andrew Medal, How Cryptocurrency Projects Are Tackling Transparency and Security Problems, *Entrepreneur* (Jun. 27, 2019), <https://www.entrepreneur.com/money-finance/how-cryptocurrency-projects-are-tackling-transparency-and/335944>.
290. Bloomberg, BitConnect's Satish Kumbhani Charged by US in \$2.4 Billion Ponzi Scam, *The Economic Times*, <https://economictimes.indiatimes.com/tech/technology/bitconnects-satish-kumbhani-charged-by-us-in-2-4-billion-ponzi-scam/articleshow/89844151.cms?from=mdr> (last updated Feb. 26, 2022, 11:47 AM).
291. Popular Blockchain Use Cases Across Industries, *Stanford Online*, <https://online.stanford.edu/popular-blockchain-use-cases-across-industries> (last visited Mar. 27, 2023).
292. Li, J., The Development of Blockchain Privacy Protection: From Bitcoin to Monero, in *Third International Conference on Electronics and Communication; Network and Computer Technology (ECNCT 2021) [Preprint]* (2022), <https://doi.org/10.1117/12.2629737>.
293. Stuart Langridge, What Is Tokenomics?, *CoinMarketCap*, <https://coinmarketcap.com/alexandria/article/what-is-tokenomics> (last visited Mar. 27, 2023).
294. Sean Stein Smith, Web3 Needs Blockchain and Tokenomics to Succeed, *Forbes* (Feb. 27, 2023), <https://www.forbes.com/sites/digital-assets/2023/02/27/web3-needs-blockchain-and-tokenomics-to-succeed/?sh=4a102dc3620d>.
295. Steven Ehrlich, The 21 Million Question: Is Bitcoin Supply Really Capped?, *Forbes* (Mar. 9, 2023), <https://www.forbes.com/sites/digital-assets/article/the-21-million-question---is-bitcoin-supply-really-capped/?sh=6f4246447984>.
296. Utility Token Definition, *CoinMarketCap*, <https://coinmarketcap.com/alexandria/glossary/utility-token> (last visited Mar. 27, 2023).
297. CNBCTV18.com, Explained | Inflationary and Deflationary Cryptocurrencies, *CNBC* (Apr. 21, 2022, 9:10 PM), <https://www.cnbctv18.com/cryptocurrency/explained--inflationary-and-deflationary-cryptocurrencies-13226952.htm>.
298. Nathan Reiff, What Does It Mean to Burn Crypto? Practical Applications, *Investopedia*, <https://www.investopedia.com/tech/cryptocurrency-burning-can-it-manage-inflation/> (last updated Jun. 2, 2022).

299. CNBCTV18.com, Explained | Coin Burning: How Is It Done & Why?, CNBC (Apr. 23, 2022), <https://www.cnbctv18.com/cryptocurrency/explained--coin-burning-how-is-it-done--why-13245532.htm>.
300. What Is BNB Auto-Burn?, Binance Academy (Jan. 12, 2022), <https://academy.binance.com/en/articles/what-is-bnb-auto-burn>.
301. Nikolay Nikov, Cryptocurrency Communities – Which Have Remained the Most Active (Part 1 of 4), The Chain Bulletin (Nov. 27, 2018, 10:31 PM), <https://chainbulletin.com/cryptocurrency-communities-which-have-remained-the-most-active-part-1-of-4>.
302. CFI Team, Dogecoin, Corporate Finance Institute, <https://corporatefinanceinstitute.com/resources/cryptocurrency/dogecoin/> (last updated Jan. 19, 2023).
303. Bouteska, A. et al., Effect of Twitter Investor Engagement on Cryptocurrencies During the COVID-19 Pandemic, *Research in International Business and Finance* 64, p. 101850 (2023), <https://doi.org/10.1016/j.ribaf.2022.101850>.
304. Bitcointalk, CoinMarketCap, <https://coinmarketcap.com/alexandria/glossary/bitcointalk> (last visited Mar. 27, 2023).
305. The Investopedia Team, Web 3.0 Explained, Plus the History of Web 1.0 and 2.0, Investopedia, <https://www.investopedia.com/web-20-web-30-5208698> (last updated Oct. 23, 2022).
306. MoneyGram, MoneyGram Announces Strategic Partnership with Ripple, Cision PR Newswire (Jun. 17, 2019), <https://www.prnewswire.com/news-releases/moneygram-announces-strategic-partnership-with-ripple-300869819.html>.
307. Gemini, What Is Chainlink in 5 Minutes, Cryptopedia, <https://www.gemini.com/cryptopedia/what-is-chainlink-and-how-does-it-work> (last updated Feb. 8, 2022).
308. Wayne Duggan, What Is Ethereum 2.0? Understanding the Ethereum Merge, Forbes Advisor (Sept. 15, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-is-ethereum-2-merge/>.
309. Overview | Consensus 2023, CoinDesk, <https://consensus.coindesk.com/overview/> (last visited Mar. 28, 2023).
310. Kevin Dwyer, What Are Cryptocurrency Layer 2 Scaling Solutions?, CoinMarketCap, <https://coinmarketcap.com/alexandria/article/what->

- are-cryptocurrency-layer-2-scaling-solutions (last visited Mar. 28, 2023).
311. CNBCTV18.com, Explained: What Is Cosmos and Why Is It Called the Internet of Blockchains?, CNBC (Dec. 23, 2021), <https://www.cnbctv18.com/cryptocurrency/explained-what-is-cosmos-and-why-is-it-called-the-internet-of-blockchains-11914832.htm>.
  312. Rug Pull Definition, CoinMarketCap, <https://coinmarketcap.com/alexandria/glossary/rug-pull> (last visited Mar. 28, 2023).
  313. Charlotte Hill & Tom Perkins, Crypto Rug Pulls: The Latest Crypto Scam, Penningtons Manches Cooper (Jan. 20, 2022), <https://www.penningtonslaw.com/news-publications/latest-news/2022/crypto-rug-pulls-the-latest-scam>.
  314. Saurav Mukherjee, Explained: What Is Crypto 'Whale', Who Manipulates Cryptoworld and Other Questions Answered, MoneyControl (May 25, 2021, 7:43 PM), <https://www.moneycontrol.com/news/business/cryptocurrency/who-is-the-crypto-whale-holding-28-of-all-dogecoin-worth-rs-8752-crore-6937831.html>.
  315. Caroline Banton, What Is a Crypto Whale and How Do They Affect Crypto Markets?, Investopedia, <https://www.investopedia.com/terms/b/bitcoin-whale.asp> (last updated May 17, 2022).
  316. Nathan Reiff, Cryptocurrency Exchanges: What They Are and How to Choose, Investopedia, <https://www.investopedia.com/tech/190-cryptocurrency-exchanges-so-how-choose/> (last updated Oct. 5, 2022).
  317. Nathan Reiff, How Much Are Cryptocurrency Exchange Fees?, Investopedia, <https://www.investopedia.com/tech/how-much-does-it-cost-buy-cryptocurrency-exchanges/> (last updated Jun. 2, 2022).
  318. Paul Marrinan, Crypto-Crime & Caveats, Thomson Reuters (Mar. 29, 2021), <https://www.thomsonreuters.com/en-us/posts/investigation-fraud-and-risk/crypto-crime-caveats/>.
  319. Pseudonymous, Coin Market Cap (Aug. 28, 2021, 05:57 AM), <https://coinmarketcap.com/academy/glossary/pseudonymous>.
  320. Nikita Tambe & Aashika Jain, Advantages and Disadvantages of Cryptocurrency in 2024, Forbes (June 10, 2024, 05:18 PM),

<https://www.forbes.com/advisor/in/investing/cryptocurrency/advantages-of-cryptocurrency/>.

321. Robert Stevens, What Are Privacy Coins and Are They Legal?, CoinDesk (Aug. 08, 2022, 08:20 PM), <https://www.coindesk.com/learn/what-are-privacy-coins-and-are-they-legal/>.
322. Ruta Kulkarni, Cryptocurrency Scam Bust: International Crackdown Unveils Massive Fraud, RegTech Times (May 09, 2024), <https://regtechtimes.com/cryptocurrency-scam-bust-international-crackdown/>.
323. BTC Peers, India's Cryptocurrency Wild West Leaves Victims Searching for Justice, CoinMarketCap (Sept. 25, 2023), <https://coinmarketcap.com/community/articles/6511bb3ea904527b9f3025d6/>.
324. Rakesh Sharma, Bitcoin Has a Regulation Problem, Investopedia (Mar. 17, 2024), <https://www.investopedia.com/news/bitcoin-has-regulation-problem/#:~:text=The%20cryptocurrency's%20rise%20in%20popularity,varying%20approaches%20to%20Bitcoin%20regulation.&text=By%20their%20very%20nature%2C%20cryptocurrencies,specific%20agencies%20within%20a%20government.>
325. Special Correspondent, Survey Suggests 71% Have Low or No Trust in Cryptocurrency, The Hindu (Nov. 24, 2021, 10:57 PM), <https://www.thehindu.com/business/markets/survey-suggests-71-have-low-or-no-trust-in-cryptocurrency/article37671635.ece>.
326. Elizabeth Lopatto, How Bitcoin Grew Up and Became Big Money, The Verge (Jan. 03, 2019, 09:30 PM), <https://www.theverge.com/2019/1/3/18166096/bitcoin-blockchain-code-currency-money-genesis-block-silk-road-mt-gox>.
327. Inside the FBI Takedown of the Mastermind Behind Website Offering Drugs, Guns and Murders for Hire, CBS News (Nov. 10, 2020, 11:03 PM), <https://www.cbsnews.com/news/ross-ulbricht-dread-pirate-roberts-silk-road-fbi/>.
328. The Investopedia Team, What Was Mt. Gox? Definition, History, Collapse, and Future, Investopedia (Apr. 23, 2024), <https://www.investopedia.com/terms/m/mt-gox.asp>.
329. Updated Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers, FATF, <https://www.fatf->

- [gafi.org/en/publications/Fatfrecommendations/Guidance-rba-virtual-assets-2021.html](https://gafi.org/en/publications/Fatfrecommendations/Guidance-rba-virtual-assets-2021.html) (last visited July 08, 2024).
330. Crypto ICO Scams [A Comprehensive Guide], CNC Intelligence (Apr. 14, 2024), <https://cncintel.com/crypto-ico-scams/>.
331. Attacks and Exploits in DeFi, Crypto.com (Aug. 10, 2021), <https://crypto.com/research/attacks-and-exploits-in-defi>.
332. NFT Scams – Real-Life Story, Fraud.com, <https://www.fraud.com/post/nft-scams-a-real-life-story> (last visited July 08, 2024).
333. Cryptojacking, Interpol, <https://www.interpol.int/en/Crimes/Cybercrime/Cryptojacking> (last visited July 08, 2024).
334. Virtual Assets, FATF, <https://www.fatf-gafi.org/en/topics/virtual-assets.html> (last visited July 08, 2024).
335. Anna Pinggen, New Rules for Crypto-Assets in the EU, Euclid (Sept. 25, 2023), [https://euclid.eu/news/new-rules-for-crypto-assets-in-the-eu/#:~:text=The%20MiCA%20Regulation%20\(Regulation%202023,with%20investing%20in%20crypto%2Dassets](https://euclid.eu/news/new-rules-for-crypto-assets-in-the-eu/#:~:text=The%20MiCA%20Regulation%20(Regulation%202023,with%20investing%20in%20crypto%2Dassets).
336. Sneha Kulkarni, Digital Rupee: RBI Widens Scope of CBDC; Non-Banking Payment Companies to Facilitate Transactions, The Economic Times (Apr. 25, 2024, 11:49 AM), <https://m.economictimes.com/wealth/save/digital-rupee-rbi-widens-scope-of-cbdc-non-banking-payment-companies-to-facilitate-transactions/articleshow/109054759.cms>.
337. Simona Mola, SEC Cryptocurrency Enforcement, Cornerstone Research (Nov. 15, 2022), <https://www.cornerstone.com/insights/reports/sec-cryptocurrency-enforcement/>.
338. What to Know About Cryptocurrency and Scams, Federal Trade Commission Consumer Advice (May 15, 2022), <https://consumer.ftc.gov/articles/what-know-about-cryptocurrency-and-scams>.
339. Surbhi Gloria Singh, Explained: The Rs 6,600 Cr Bitcoin Ponzi Scam Involving Raj Kundra, Business Standard (Apr. 22, 2024, 03:45 PM), [https://www.business-standard.com/finance/personal-finance/explained-the-rs-6-600-cr-bitcoin-ponzi-scam-involving-raj-kundra-124042200630\\_1.html](https://www.business-standard.com/finance/personal-finance/explained-the-rs-6-600-cr-bitcoin-ponzi-scam-involving-raj-kundra-124042200630_1.html).

340. Kristina Lucrezia Cornè, What Is a Phishing Attack in Crypto, and How to Prevent It?, Coin Telegraph (July 13, 2023), <https://cointelegraph.com/learn/what-is-a-phishing-attack-in-crypto-and-how-to-prevent-it>.
341. What Is a Pump and Dump in Crypto?, Coinbase (May 01, 2024, 07:47 PM), <https://www.coinbase.com/learn/crypto-glossary/what-is-a-pump-and-dump-in-crypto>.
342. Rug Pull, Coin Market Cap (Aug. 21, 2021, 05:47 AM), <https://coinmarketcap.com/academy/glossary/rug-pull>.
343. David Voreacos, BitConnect Promoter Gets 38 Months in \$2.4 Billion Ponzi Scam, Bloomberg (Sept. 17, 2022, 08:25 AM), <https://www.bloomberg.com/news/articles/2022-09-17/bitconnect-promoter-gets-38-months-in-2-4-billion-ponzi-scam>.
344. Co-Founder of Multibillion-Dollar Cryptocurrency Scheme “OneCoin” Sentenced to 20 Years in Prison, United States Attorney’s Office, Southern District of New York (Sept. 12, 2023), <https://www.justice.gov/usao-sdny/pr/co-founder-multibillion-dollar-cryptocurrency-scheme-onecoin-sentenced-20-years-prison>.
345. Sidney Leng, Chinese Cryptocurrency Scam Ringleaders Jailed in US\$2.25 Billion Ponzi Scheme Involving PlusToken Platform, South China Morning Post (Dec. 01, 2020, 07:15 PM), <https://www.scmp.com/economy/china-economy/article/3112115/chinese-cryptocurrency-scam-ringleaders-jailed-us225-billion>.
346. Brian Nibley and Miranda Marquit, Guide to Cryptocurrency Scams: How to Avoid Them, Newsweek Vault (May 23, 2024 03:56 PM), <https://www.newsweek.com/vault/investing/cryptocurrency-scams/>.
347. Becky Peterson, A Crypto Startup That Vanished and Changed Its Website to the Word 'Penis' Allegedly Stole the Identities of Its Team, Business Insider (Jan. 30, 2018, 02:55 PM), <https://www.businessinsider.com/cryptocurrency-and-blockchain-startup-prodeum-pulled-an-exit-scam-2018-1>.
348. Money Laundering Through Cryptocurrencies, UN Toolkit on Synthetic Drugs, <https://syntheticdrugs.unodc.org/syntheticdrugs/en/cybercrime/launde-ringproceeds/moneylaundering.html> (last visited July 08, 2024).
349. David Grau, What Law Enforcement Needs to Know About Crypto Money Laundering, Cognyte (Aug. 08, 2023),

<https://www.cognyte.com/blog/anti-money-laundering-cryptocurrency/>.

- 350.Chainalysis Team, Crypto Money Laundering: Four Exchange Deposit Addresses Received Over \$1 Billion in Illicit Funds in 2022, Chainalysis (Jan. 26, 2023), <https://www.chainalysis.com/blog/crypto-money-laundering-2022/>.
- 351.Anti-Money Laundering (AML) in Cryptocurrency, Elliptic, <https://www.elliptic.co/anti-money-laundering-aml-in-cryptocurrency> (last visited July 08, 2024).
- 352.Merkle Science, Mixers and Tumblers: Regulatory Overview and Use in Illicit Activities, Merkle Science (Feb. 18, 2022, 07:00 AM), <https://knowledgebase.merklescience.com/technologies/mixers-and-tumblers>.
- 353.Arda Akartuna, Five Ways Coin Swap Services Facilitate Money Laundering and Sanctions Evasion, Elliptic (Oct. 02, 2023), <https://www.elliptic.co/blog/five-ways-coin-swap-services-facilitate-money-laundering-and-sanctions-evasion>.
- 354.Merkle Science, Chain Hopping: The Future of Crypto Money Laundering, Merkle Science (July 06, 2023, 01:50 PM), <https://knowledgebase.merklescience.com/security-risk/chain-hopping-the-future-of-crypto-money-laundering>.
- 355.Press Release, Office of Public Affairs, U.S. Department of Justice, BTC-e Operator Pleads Guilty to Money Laundering Conspiracy (May 03, 2024), <https://www.justice.gov/opa/pr/btc-e-operator-pleads-guilty-money-laundering-conspiracy#:~:text=A%20Russian%20national%20pleaded%20guilty,world's%20largest%20virtual%20currency%20exchanges>.
- 356.Press Release, Office of Public Affairs, U.S. Department of Justice, Ohio Resident Pleads Guilty to Operating Darknet-Based Bitcoin 'Mixer' That Laundered Over \$300 Million (Aug. 18, 2021), <https://www.justice.gov/opa/pr/ohio-resident-pleads-guilty-operating-darknet-based-bitcoin-mixer-laundered-over-300-million>.
- 357.Dan Mangan and Eamon Javers, Bitcoin Launderer Pleads Guilty, Admits to Massive Bitfinex Hack, CNBC (Aug. 03, 2023, 06:03 PM), <https://www.cnbc.com/2023/08/03/new-york-man-admits-being-original-bitfinex-hacker-during-guilty-plea-in-dc-to-bitcoin-money-laundering.html>.
- 358.Daniel Palmer, Chinese Authorities Have Seized a Massive \$4B in Crypto from PlusToken Scam, CoinDesk (Nov. 27, 2020, 04:05 PM),

- <https://www.coindesk.com/markets/2020/11/27/chinese-authorities-have-seized-a-massive-4b-in-crypto-from-plustoken-scam/>.
359. Sam Frizell, How the Feds Nabbed Alleged Silk Road Drug Kingpin 'Dread Pirate Roberts', Time (Jan. 21, 2015, 07:00 AM), <https://time.com/3673321/silk-road-dread-pirate-roberts/>.
360. Helina Hilda, Cryptocurrency Money Laundering Guide: Meaning, Risks & Prevention, Hyper Verge (Aug. 25, 2023), <https://hyperverge.co/blog/money-laundering-in-cryptocurrency-risks-prevention/>.
361. Nathan Reiff, Can Crypto Be Hacked?, Investopedia (May 11, 2024), <https://www.investopedia.com/articles/investing/032615/can-bitcoin-be-hacked.asp>.
362. Press Release, Cybersecurity & Infrastructure Security Agency, Crypto Ransomware (Oct. 22, 2014), <https://www.cisa.gov/news-events/alerts/2014/10/22/crypto-ransomware>.
363. Mitigating Malware and Ransomware Attacks, National Cyber Security Centre (Feb. 13, 2020), <https://www.ncsc.gov.uk/guidance/mitigating-malware-and-ransomware-attacks>.
364. Yoichi Tsuchiya & Naoki Hiramoto, How Cryptocurrency Is Laundered: Case Study of Coincheck Hacking Incident, 4 Forensic Science International: Reports (2021).
365. Sebastian Sinclair, 30 Charged in Japan with Trading \$96M of Crypto Stolen in Coincheck Hack, CoinDesk (Jan. 22, 2021, 03:52 PM), <https://www.coindesk.com/policy/2021/01/22/30-charged-in-japan-with-trading-96m-of-crypto-stolen-in-coincheck-hack/>.
366. Press Release, Office of Public Affairs, U.S. Department of Justice, Bitfinex Hacker and Wife Plead Guilty to Money Laundering Conspiracy Involving Billions in Cryptocurrency (Aug. 03, 2023), <https://www.justice.gov/opa/pr/bitfinex-hacker-and-wife-plead-guilty-money-laundering-conspiracy-involving-billions>.
367. David Siegel, Understanding the DAO Attack, CoinDesk (Jan. 14, 2023, 01:16 AM), <https://www.coindesk.com/learn/understanding-the-dao-attack/>.
368. Tommaso Gagliardoni, The Poly Network Hack Explained, Kudelski Security (Aug. 12, 2021), <https://research.kudelskisecurity.com/2021/08/12/the-poly-network-hack-explained/>.

369. Ryan Browne, Nearly All of the \$600 Million Stolen in a Huge Crypto Heist Has Been Returned — But There's a Catch, CNBC (Aug. 13, 2021, 06:58 AM), <https://www.cnn.com/2021/08/13/poly-network-hack-nearly-all-of-600-million-in-crypto-returned.html>.
370. Kaspersky IT Encyclopedia, Crypto-Ransomware, Kaspersky (July 08, 2017), <https://encyclopedia.kaspersky.com/glossary/cryptomalware/>.
371. David Carlisle, Ransomware & Crypto: The Growing Compliance Challenge, Reuters (May 01, 2023, 11:37 PM), <https://www.reuters.com/legal/legalindustry/ransomware-crypto-growing-compliance-challenge-2023-05-01/>.
372. Deeksha Somani, Crypto Phishing Scam: What Is It and How to Stay Safe from It, Times of India (Jan. 18, 2024, 11:53 PM), <https://timesofindia.indiatimes.com/gadgets-news/crypto-phishing-scam-what-is-it-and-how-to-stay-safe-from-it/articleshow/106966731.cms>.
373. Mitigating Malware and Ransomware Attacks, National Cyber Security Centre (Feb. 13, 2020), <https://www.ncsc.gov.uk/guidance/mitigating-malware-and-ransomware-attacks>.
374. Deep Secure Ltd, A Practical Guide to Combatting Ransomware (2020).
375. Alex Hern and Samuel Gibbs, What Is WannaCry Ransomware and Why Is It Attacking Global Computers?, The Guardian (May 12, 2017, 05:16 PM), <https://www.theguardian.com/technology/2017/may/12/nhs-ransomware-cyber-attack-what-is-wanacrypt0r-20>.
376. Dan Milmo, NHS Ransomware Attack: What Happened and How Bad Is It?, The Guardian (Aug. 11, 2022, 09:21 PM), <https://www.theguardian.com/technology/2022/aug/11/nhs-ransomware-attack-what-happened-and-how-bad-is-it>.
377. Andy Greenberg, The Untold Story of NotPetya, the Most Devastating Cyberattack in History, Wired (Aug. 22, 2019, 05:00 AM), <https://www.wired.com/story/notpetya-cyberattack-ukraine-russia-code-crashed-the-world/>.
378. What Is Ryuk Ransomware? A Detailed Breakdown, Sentinel One (July 16, 2021, 07:57 PM), <https://www.sentinelone.com/cybersecurity-101/ryuk-ransomware/>.

379. Lily Hay Newman, Ransomware Hits Dozens of Hospitals in an Unprecedented Wave, *Wired* (Oct. 29, 2020, 03:17 PM), <https://www.wired.com/story/ransomware-hospitals-ryuk-trickbot/>.
380. What Is REvil Ransomware?, *Nomios* (Mar. 02, 2021), <https://www.nomios.com/resources/what-is-revil-ransomware/>.
381. Press Release, Cybersecurity & Infrastructure Security Agency, DarkSide Ransomware: Best Practices for Preventing Business Disruption from Ransomware Attacks (May 11, 2021), <https://www.cisa.gov/news-events/cybersecurity-advisories/aa21-131a>.
382. DarkSide Ransomware Operations, *SISA* (Sept. 28, 2021), <https://www.sisainfosec.com/blogs/darkside-ransomware-operations/>.
383. Medha Singh, Crypto Ransom Attack Payments Hit Record \$1 Billion in 2023 – Chainalysis, *Reuters* (Feb. 08, 2024, 02:48 AM), <https://www.reuters.com/technology/cybersecurity/crypto-ransom-attack-payments-hit-record-1-billion-2023-chainalysis-2024-02-07/>.
384. The Investopedia Team, What Is Tor? Who Uses It, How to Use It, Legality, and Purpose, *Investopedia* (Sept. 23, 2022), <https://www.investopedia.com/terms/t/tor.asp>.
385. Darknet Market, *Hudson Intelligence*, <https://www.fraudinvestigation.net/cryptocurrency/tracing/darknet-market> (last visited July 08, 2024).
386. What Is the Darknet and What Does It Have to Do with Bitcoin?, *Bitpanda* (Oct. 09, 2019, 09:08 AM), <https://www.bitpanda.com/academy/en/lessons/what-is-the-darknet-and-what-does-it-have-to-do-with-bitcoin>.
387. AlphaBay: How Seven Countries Worked Together to Take Down the Biggest Online Black Market for Drugs, U.N. Office on Drugs and Crime, <https://www.unodc.org/unodc/en/untoc20/truecrimestories/alphabay.html> (last visited July 08, 2024).
388. Press Release, Office of Public Affairs, U.S. Department of Justice, AlphaBay, the Largest Online 'Dark Market,' Shut Down (July 20, 2017), <https://www.justice.gov/opa/pr/alphabay-largest-online-dark-market-shut-down>.

389. Andy Greenberg, Operation Bayonet: Inside the Sting That Hijacked an Entire Dark Web Drug Market, *Wired* (Mar. 08, 2018, 11:38 AM), <https://www.wired.com/story/hansa-dutch-police-sting-operation/>.
390. P.H. Madore, Dream Market Shuts Down: Has the DEA Claimed Another Darknet Victim?, *CCN* (Apr. 21, 2023, 01:56 AM), <https://www.ccn.com/dream-market-shuts-down-has-the-dea-claimed-another-darknet-victim/>.
391. Press Release, Office of Public Affairs, U.S. Department of Justice, Three Germans Who Allegedly Operated Dark Web Marketplace with Over 1 Million Users Face U.S. Narcotics and Money Laundering Charges (May 03, 2019), <https://www.justice.gov/opa/pr/three-germans-who-allegedly-operated-dark-web-marketplace-over-1-million-users-face-us>.
392. Brian Barrett, 179 Arrested in Massive Global Dark Web Takedown, *Wired* (Sept. 22, 2020, 12:57 PM), <https://www.wired.com/story/operation-disruptor-179-arrested-global-dark-web-takedown/>.
393. Soumya Awasthi, Exploring the Nexus: Cryptocurrency, Zakat, and Terror Funding, Observer Research Foundation (May 08, 2024), <https://www.orfonline.org/expert-speak/exploring-the-nexus-cryptocurrency-zakat-and-terror-funding>.
394. Reuters, Crypto's Role in Terrorist Financing, *Reuters* (Oct. 24, 2023, 12:50 AM), <https://www.reuters.com/technology/cryptos-role-terrorist-financing-2023-10-23/>.
395. Varun V.M., Prospects and Models of Combating Cryptocurrency Crimes, 4 *Eucrim* 365-370 (2023).
396. Chainalysis Team, Assessing Terrorism Financing On-chain Is Crucial and Complex, *Chainalysis* (May 07, 2024), <https://www.chainalysis.com/blog/assessing-terrorism-financing-on-chain/>.
397. Ali Rogin and Harry Zahn, The Role of Cryptocurrency in Financing Terrorist Organizations, *PBS News* (Nov. 04, 2023, 05:35 PM), <https://www.pbs.org/newshour/show/the-role-of-cryptocurrency-in-financing-terrorist-organizations>.
398. Scott Glover and Curt Devine, 'They're Opportunistic and Adaptive': How Hamas Is Using Cryptocurrency to Raise Funds, *CNN* (Oct. 12, 2023, 10:54 PM), <https://www.cnn.com/2023/10/12/us/hamas-funding-crypto-invs/index.html>.

399. Press Release, Office of Public Affairs, U.S. Department of Justice, Global Disruption of Three Terror Finance Cyber-Enabled Campaigns (Aug. 13, 2020), <https://www.justice.gov/opa/pr/global-disruption-three-terror-finance-cyber-enabled-campaigns>.
400. Matthew Hill, Islamic State Is Increasingly Using Crypto to Fund Africa Militant Goals, Bloomberg (Mar. 11, 2024, 09:30 PM), <https://www.bloomberg.com/news/articles/2024-03-11/islamic-state-using-more-crypto-to-fund-africa-militant-goals>.
401. David Voreacos, Binance Lapses Let Hamas, ISIS, al-Qaeda Make Bitcoin Trades, Bloomberg (Nov. 22, 2023, 04:30 PM), <https://www.bloomberg.com/news/articles/2023-11-22/binance-lapses-boosted-terrorists-hackers-sanctions-violators>.
402. Jamie Crawley, Hamas, Hezbollah Now Prefer Tron to Bitcoin: Reuters, Coin Desk (Nov. 27, 2023, 06:36 PM), <https://www.coindesk.com/business/2023/11/27/hamas-hezbollah-now-prefer-tron-to-bitcoin-reuters/>.
403. Laura Smith, Messaging App Telegram Centrepiece of IS Social Media Strategy, BBC (June 05, 2017), <https://www.bbc.com/news/technology-39743252>.
404. James Chen, Financial Crimes Enforcement Network (FinCEN) Overview, Investopedia (Apr. 27, 2022), <https://www.investopedia.com/terms/f/fincen.asp>.
405. James Chen, Securities and Exchange Commission (SEC) Defined, How It Works, Investopedia (Apr. 16, 2024), <https://www.investopedia.com/terms/s/sec.asp>.
406. The Investopedia Team, Commodity Futures Trading Commission (CFTC) Overview, Investopedia (Sept. 26, 2021), <https://www.investopedia.com/terms/c/cftc.asp>.
407. Katie Jackson, The 5th Anti-Money Laundering Directive, Deloitte (Jan. 11, 2019), <https://www.deloitte.com/uk/en/Industries/financial-services/research/fifth-anti-money-laundering-directive.html>.
408. Markets in Crypto-Assets Regulation (MiCA), European Securities and Market Authority, <https://www.esma.europa.eu/esmas-activities/digital-finance-and-innovation/markets-crypto-assets-regulation-mica> (last visited July 08, 2024).
409. Filip Windak and Rafal Wloczka, Markets in Crypto-assets (MiCA) – New EU Law on Crypto-assets, Bird & Bird (Jan. 25, 2024),

<https://www.twobirds.com/en/insights/2024/global/markets-in-crypto-assets-new-eu-law-on-crypto-assets>.

410. BSC News, South Korea Plans Regulatory Crackdown on Crypto Mixers Amidst Rising Money Laundering Concerns, BSCN (Jan. 15, 2024), <https://bsc.news/post/south-korea-plans-regulatory-crackdown-on-crypto-mixers-amidst-rising-money-laundering-concerns>.
411. Vidya Ranganathan and Summer Zhen, Bruised by Stock Market, Chinese Rush into Banned Bitcoin, Reuters (Jan. 25, 2024), <https://www.reuters.com/technology/bruised-by-stock-market-chinese-rush-into-banned-bitcoin-2024-01-25/#:~:text=Crypto%20trading%20and%20mining%20has,like%20gold%2C%22%20says%20Run>.
412. Joint Cybercrime Action Taskforce (J-CAT), Europol, <https://www.europol.europa.eu/operations-services-and-innovation/services-support/joint-cybercrime-action-taskforce> (last visited July 08, 2024).
413. What is FATF, Business Standard, <https://www.business-standard.com/about/what-is-fatf> (last visited July 08, 2024).
414. What is INTERPOL?, Interpol, <https://www.interpol.int/en/Who-we-are/What-is-INTERPOL> (last visited July 08, 2024).
415. James McBride and Noah Berman, What Does the G20 Do?, Council on Foreign Relations (Oct. 11, 2023, 10:15 AM), <https://www.cfr.org/backgrounder/what-does-g20-do>.
416. Blockchain-What It Is and Why It Matters, SAS Institute, [https://www.sas.com/en\\_in/insights/analytics/blockchain.html](https://www.sas.com/en_in/insights/analytics/blockchain.html) (last visited July 08, 2024).
417. Costantino Grasso, Europol: Its Origins, Functions, and Future Development, UK in a Changing Europe (Dec. 06, 2016), <https://ukandeu.ac.uk/explainers/europol-its-origins-functions-and-future-development/>.
418. Francis Shin, What's Behind China's Cryptocurrency Ban?, World Economic Forum (Jan. 31, 2022), <https://www.weforum.org/agenda/2022/01/what-s-behind-china-s-cryptocurrency-ban/>.
419. Press Trust of India, ED Seizes Funds Worth Rs 90 Crore Kept in Binance, ZebPay, WazirX Wallets, Business Standard (Apr. 30, 2024), <https://mybs.in/2dVD98i>.

420. Rajesh Kumar, Financial Intelligence Unit Penalizes Binance \$2.25 Million for Anti-Money Laundering Violations, LiveLaw (June 24, 2024, 07:45 PM), <https://www.livelaw.in/news-updates/financial-intelligence-unit-penalizes-binance-225-million-anti-money-laundering-violations-261304>.
421. Commodity Exchange Act & Regulations, Commodity Futures Trading Commission, <https://www.cftc.gov/LawRegulation/CommodityExchangeAct/index.htm> (last visited July 08, 2024).
422. Anti-Money Laundering and Countering the Financing of Terrorism at EU Level, European Commission, [https://finance.ec.europa.eu/financial-crime/anti-money-laundering-and-countering-financing-terrorism-eu-level\\_en](https://finance.ec.europa.eu/financial-crime/anti-money-laundering-and-countering-financing-terrorism-eu-level_en) (last visited July 08, 2024).
423. Julia Kagan, Financial Services Agency (FSA): What It Is, How It Works, Investopedia (Oct. 30, 2022), <https://www.investopedia.com/terms/f/financial-services-agency-fsa.asp>.
424. AML/CFT Legislation in Korea, KOFIU, <https://www.kofiu.go.kr/eng/legislation/legislation.do> (last visited July 08, 2024).
425. Grand View Research, Cryptocurrency Exchange Platform Market Size Report, 2030, available at: <https://www.grandviewresearch.com/industry-analysis/cryptocurrency-exchange-platform-market-report> (Accessed: March 28, 2023).
426. Werner Vermaak, What Are Peer-to-Peer (P2P) Networks?, CoinMarketCap, <https://coinmarketcap.com/alexandria/article/what-is-peer-to-peer-p2p> (last visited Mar. 28, 2023).
427. What Is a Crypto Trading Bot and How Do They Work?, ClearTax (Nov. 30, 2022), <https://cleartax.in/s/crypto-trading-bots>.
428. CFI Team, Cryptocurrency Exchanges, Corporate Finance Institute, <https://corporatefinanceinstitute.com/resources/cryptocurrency/cryptocurrency-exchanges/> (last updated Mar. 9, 2023).
429. Nathan Reiff, What Are Centralized Cryptocurrency Exchanges?, Investopedia (last updated Aug. 27, 2021), <https://www.investopedia.com/tech/what-are-centralized-cryptocurrency-exchanges/>.

430. Rashi Maheshwari, WazirX Exchange Review 2023, Forbes Advisor (Sept. 20, 2022), <https://www.forbes.com/advisor/in/investing/cryptocurrency/wazirx-exchange-review/>.
431. Binance Acquires India's Leading Digital Asset Platform WazirX to Launch Multiple Fiat-to-Crypto Gateways, Binance Blog (Mar. 28, 2023), <https://www.binance.com/en/blog/all/binance-acquires-indias-leading-digital-asset-platform-wazirx-to-launch-multiple-fiatcrypto-gateways-404105749895733248>.
432. Katelyn Peters, Binance Exchange, Investopedia, <https://www.investopedia.com/terms/b/binance-exchange.asp> (last updated Feb. 17, 2023).
433. Todd Haselton, Here's What Coinbase Is and How to Use It to Buy and Sell Cryptocurrencies, CNBC (Apr. 14, 2021, 10:08 PM), <https://www.cnbc.com/2021/04/14/what-is-coinbase-how-to-use-it.html>.
434. Shobhit Seth, What Is Kraken? How It Works, How It Stands Out, and Issues, Investopedia, <https://www.investopedia.com/tech/what-kraken/> (last updated Jan. 15, 2023).
435. What Is DEX?, Coinbase, <https://www.coinbase.com/learn/crypto-basics/what-is-a-dex> (last visited Mar. 28, 2023).
436. Yoav Vilner, Building A Trustless Exchange For The New Derivatives Paradigm, Forbes (Sept. 11, 2018), <https://www.forbes.com/sites/yoavvilner/2018/09/11/building-a-trustless-exchange-for-the-new-derivatives-paradigm/?sh=31acba106b89>.
437. Insider Studios, What Is DEX — Decentralised Exchanges Give Investors More Control and More Profit, Business Insider India (Sept. 13, 2021), <https://www.businessinsider.in/cryptocurrency/news/what-is-dex-decentralised-exchanges-give-investors-more-control-and-more-profit/articleshow/86164969.cms>.
438. Marcel Deer, Pros and Cons of Decentralized Exchange (DEX), DefiPedia (Apr. 5, 2022), <https://defipedia.com/blog/pros-and-cons-of-decentralized-exchange-dex>.
439. What's the Difference Between a CEX and a DEX?, Binance Academy (Dec. 15, 2022), <https://academy.binance.com/en/articles/what-s-the-difference-between-a-cex-and-a-dex>.

440. The Crucible of Privacy: Why Decentralized Exchange Is the Only Way, Bitcoin.com (Feb. 5, 2019), <https://news.bitcoin.com/the-crucible-of-privacy-why-decentralized-exchange-is-the-only-way/>.
441. Mediawire, What Is Crypto Day Trading? Beginners Guide, The Economic Times, <https://economictimes.indiatimes.com/industry/banking/finance/what-is-crypto-day-trading-beginners-guide/articleshow/90377862.cms?from=mdr> (last updated Mar. 22, 2022, 5:45 PM).
442. Day Trading for a Living – Pros and Cons of Trading for a Living, Kotak Securities, <https://www.kotaksecurities.com/ksweb/Research/Investment-knowledge-Bank/day-trading-for-a-living> (last visited Mar. 28, 2023).
443. Jake Frankenfield, HODL: The Cryptocurrency Strategy of "Hold on for Dear Life" Explained, Investopedia, <https://www.investopedia.com/terms/h/hodl.asp> (last updated July 18, 2022).
444. Matt Hougan, For Bitcoin, HODLing Is The Best Strategy... With One Big Caveat, Forbes (Apr. 23, 2018), <https://www.forbes.com/sites/matthougan/2018/04/23/bitcoin-hodling-is-the-best-strategy-with-one-big-caveat/?sh=49d032933266>.
445. Rafael Schultze-Kraft, Quantifying Short-Term and Long-Term Holder Bitcoin Supply, Glassnode Insights (Nov. 17, 2020), <https://insights.glassnode.com/quantifying-bitcoin-hodler-supply/>.
446. Emily Flitter, It's Hard to Tell When the Crypto Bubble Will Burst, or If There Is One, The New York Times (Jan. 27, 2022), <https://www.nytimes.com/2022/01/27/business/crypto-price-bubble.html>.
447. Edward Harrison, The Easy Money Era Is Over and the Crypto Bubble With It, Bloomberg (Nov. 16, 2022, 1:43 AM), <https://www.bloomberg.com/news/newsletters/2022-11-15/the-easy-money-era-is-over-and-the-crypto-bubble-with-it>.
448. Pawan Nahar, Bitcoin Enters Teenage, Turns Rs 1,000 in Rs 76.4 Cr in 13 Years, The Economic Times, <https://economictimes.indiatimes.com/markets/cryptocurrency/bitcoin-enters-teenage-turns-rs-1000-in-rs-76-4-cr-in-13-years/articleshow/88684799.cms> (last updated Jan. 4, 2022, 1:12 PM).

449. Viraj Gaur, BitConnect: Revisiting the \$2.4 Billion Crypto Scam as Founder Flees India, *The Quint* (Mar. 3, 2022, 4:18 PM), <https://www.thequint.com/tech-and-auto/tech-news/bitconnect-revisiting-the-24-billion-crypto-scam-as-founder-flees-india>.
450. Squid Game Crypto Token Collapses in Apparent Scam, *BBC News* (Nov. 2, 2021), <https://www.bbc.com/news/business-59129466>.
451. Squid Game Scam: Everything You Should Know, *CNBC* (Nov. 8, 2021), <https://www.cnbc.com/2021/11/08/squid-game-scam-everything-you-should-know-11380272.htm>.
452. Press Release, Department of Justice, Co-Founder of Multi-Billion-Dollar Cryptocurrency Pyramid Scheme “OneCoin” Pleads Guilty (Dec. 16, 2022), <https://www.justice.gov/opa/pr/bitconnect-founder-indicted-global-24-billion-cryptocurrency-scheme>.
453. Becky Peterson, A Crypto Startup That Vanished and Changed Its Website to the Word 'Penis' Allegedly Stole the Identities of Its Team, *Business Insider India* (Jan. 30, 2018), <https://www.businessinsider.in/tech/a-crypto-startup-that-vanished-and-changed-its-website-to-the-word-penis-allegedly-stole-the-identities-of-its-team/articleshow/62702230.cms>.
454. Tanzeel Akhtar, Ringleaders of PlusToken Scam Jailed for Up to 11 Years, *Nasdaq* (Dec. 1, 2020, 8:15 AM), <https://www.nasdaq.com/articles/ringleaders-of-plustoken-scam-jailed-for-up-to-11-years-2020-12-01>.
455. Nellius Irene, Tron Burn Total Exceeds 11 Billion TRX, *The Crypto Basic* (Sept. 2, 2022), <https://thecryptobasic.com/2022/09/02/tron-burn-total-exceeds-11-billion-trx/>.
456. What Is EIP 1559?, *Bitcoin.com*, <https://news.bitcoin.com/the-crucible-of-privacy-why-decentralized-exchange-is-the-only-way/> (last visited Mar. 28, 2023).
457. Hannah Lang & Elizabeth Howcroft, Explainer: What Is 'Staking,' the Cryptocurrency Practice in Regulators' Crosshairs?, *Reuters* (Feb. 10, 2023), <https://www.reuters.com/business/finance/what-is-staking-cryptocurrency-practice-regulators-crosshairs-2023-02-10/>.
458. Merav Ozair, Staking Ethereum (ETH): How to Do It, and the Pros and Cons, *Nasdaq* (Oct. 5, 2022, 10:22 AM), <https://www.nasdaq.com/articles/ringleaders-of-plustoken-scam-jailed-for-up-to-11-years-2020-12-01>.

459. Sam Becker, What to Know About Staking — the Process of Locking Up Crypto Holdings to Earn Rewards and Interest, Business Insider, <https://www.businessinsider.com/personal-finance/staking-crypto?IR=T> (last updated July 12, 2022).
460. What Are ICOs and How Do They Work?, Smith Gambrell Russell, <https://www.sgrlaw.com/what-are-icos-and-how-do-they-work/> (last visited Mar. 28, 2023).
461. Jake Frankenfield, Initial Coin Offering (ICO): Coin Launch Defined, with Examples, Investopedia, <https://www.investopedia.com/terms/i/initial-coin-offering-ico.asp> (last updated Aug. 18, 2022).
462. Vitalik Buterin, Launching the Ether Sale, Ethereum Foundation Blog (July 22, 2014), <https://blog.ethereum.org/2014/07/22/launching-the-ether-sale>.
463. Kate Rooney, A Blockchain Start-Up Just Raised \$4 Billion Without a Live Product, CNBC (May 31, 2018, 12:26 PM), <https://www.cnbc.com/2018/05/31/a-blockchain-start-up-just-raised-4-billion-without-a-live-product.html>.
464. Jonathan Keane, \$35 Million in 30 Seconds: Token Sale for Internet Browser Brave Sells Out, Coindesk (May 31, 2017, 10:10 PM), <https://www.coindesk.com/markets/2017/05/31/35-million-in-30-seconds-token-sale-for-internet-browser-brave-sells-out/>.
465. How to Read Crypto Charts?, Moneycontrol, <https://www.moneycontrol.com/msite/wazirx-cryptocontrol-articles/how-to-read-crypto-charts/> (last visited Mar. 28, 2023).
466. Jeffrey Craig, How to Trade Crypto With Multiple Time Frame Analysis, Phemex (June 11, 2021), <https://phemex.com/academy/how-to-use-multiple-time-frame-analysis>.
467. Dan Ashmore, A Brief History of Web 3.0, Forbes Advisor (Aug. 26, 2022), <https://www.forbes.com/advisor/investing/cryptocurrency/what-is-web-3-0/>.
468. Steven Ehrlich, What Is Web3?, Forbes (Mar. 10, 2023), <https://www.forbes.com/sites/digital-assets/article/what-is-web3/?sh=12476f067a43>.
469. What Is the Ethereum Virtual Machine & How Does It Work?, Hedera, <https://hedera.com/learning/smart-contracts/ethereum-virtual-machine> (last visited Mar. 28, 2023).

470. Robyn Conti & John Schmidt, What Is an NFT? How Do NFTs Work?, Forbes Advisor, <https://www.forbes.com/advisor/in/investing/cryptocurrency/what-is-an-nft-how-do-nfts-work/> (last updated Sept. 16, 2022).
471. Abram Brown, Beeple NFT Sells for \$69.3 Million, Becoming Most-Expensive Ever, Forbes (Mar. 11, 2021), <https://www.forbes.com/sites/abrambrown/2021/03/11/beeple-art-sells-for-693-million-becoming-most-expensive-nft-ever/?sh=2acc87062448>.
472. Smita Tripathi, How NFTs Are Disrupting the Art World, Business Today (Feb. 20, 2022), <https://www.businesstoday.in/magazine/luxury-lifestyle/story/how-nfts-are-disrupting-the-art-world-321706-2022-02-15>.
473. Dhiraphol Suwanprateep, NFTs: Disruption, Transformation and Opportunities, Baker McKenzie, <https://www.bakermckenzie.com/en/insight/publications/2022/01/nft-s-disruption-transformation-opportunities> (last visited Mar. 28, 2023).
474. What Is the NFT Bubble?, CNBC (last updated Oct. 4, 2022), <https://www.cnbc.tv/18.com/cryptocurrency/what-is-the-nft-bubble-14869071.htm>.
475. Gregory Barber, NFTs Are Hot. So Is Their Effect on the Earth's Climate, Wired (Mar. 6, 2021), <https://www.wired.com/story/nfts-hot-effect-earth-climate/>.
476. Gil Penchina, *Mobile was Internet 2.0. It changed everything. Crypto is Internet 3.0.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
477. Mark Cuban, *Not understanding blockchain, it's going to smack you down and make you bleed.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
478. Najah Roberts, Investing in Crypto is like being married, you have to keep going through the good and the bad, for better or for worse, for richer or for poorer TIL death do us part. HODL., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
479. Vitalik Buterin, If crypto succeeds, it's not because it empowers better people. It's because it empowers better institutions., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

480. Brock Pierce, Every smart person that I admire in the world, and those I semi-fear, is focused on this concept of crypto for a reason. They understand that this is the driving force of the fourth industrial revolution: steam engine, electricity, then the microchip - blockchain and crypto is the fourth., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
481. Elon Musk, *I am late to the party, but I am a supporter of Bitcoin.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
482. Hal Finney, *The computer can be used as a tool to liberate and protect people, rather than to control them.*, Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).
483. Eric Schmidt, The ability to create something which is not duplicable in the digital world has enormous value ... Lots of people will build businesses on top of that., Trality Blog, <https://www.trality.com/blog/the-most-famous-crypto-quotes> (last visited Oct. 3, 2024).

